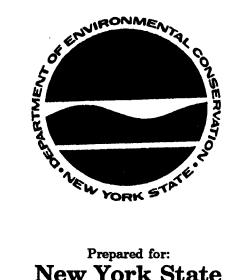
ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

ATLANTIC ASBESTOS

Site No. 314019 Town of Red Hook, New York Dutchess County

DATE: April 1991



New York State
Department of
Environmental Conservation

50 Wolf Road, Albany, New York 12233 Thomas C. Jorling, Commissioner

Division of Hazardous Waste Remediation Michael J. O'Toole, Jr., P.E., *Director*

> By: YEC, Inc.

Under contract to:

Lawler, Matusky, & Skelly Engineers



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ATLANTIC ASBESTOS
TOWN OF RED HOOK, NEW YORK
DUTCHESS COUNTY
NYSDEC I.D. NO. 314019

PREPARED FOR

DIVISION OF HAZARDOUS WASTE REMEDIATION
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 WOLF ROAD
ALBANY, NEW YORK 12233-0001





PREPARED BY

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In Association With

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PLATE A Site Survey Map including Location of Monitoring Wells and Sampling Points

1.0 EXECUTIVE SUMMARY

Atlantic Asbestos is listed as a Class 3 inactive hazardous waste site by the NYSDEC Division of Hazardous Waste Remediation. It has been listed as such since 1980. The Atlantic Asbestos site is located at the intersection of Spring Lake Road (Dutchess County road #56) and Cokertown Road, approximately 1 1/2 miles east of the intersection of U.S. Highway 9 and Spring Lake Road, in the Town of Red Hook, Dutchess County, New York (Figures 1-1 and 1-2). The site contains two parcels (Plate A, Survey and Tax Map). The present landowners are Red Hook Paper Company (owned by Barry Hull) and James Horkan of Spring Lake Road in Red Hook. The site is approximately 66 acres in area, including two ponds, which encompass about 3/4 and 8 acres, respectively.

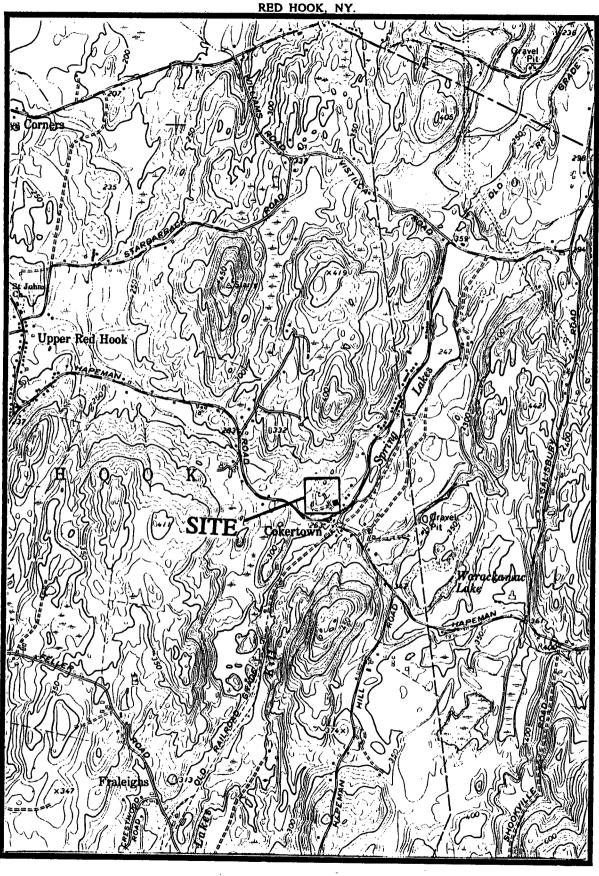
In 1946, the Atlantic Asbestos Corporation began building in preparation of manufacturing asbestos fiber, asbestos paper and low grade paper at this site (Appendix A, Ref. 1). The facility continued operations until 1977 under the management of Atlantic Asbestos. In 1950, the paper mill became operational with the completion of a "closed loop water recycling system" (Appendix A, Ref. 2). This was in reality a chain of lagoons that led to a large pond. The large pond drained to a smaller pond when a gate valve was opened. The smaller pond served to supply water for the manufacturing processes. If the large pond was not allowed to drain after a significant rainfall, the potential existed for the large pond to overflow.

The plant operated without incident for many years. In the spring of 1974, complaints by neighbors began, with claims that the "closed loop" system was not operated properly during periods of high runoff. Allegedly, a garage was flooded and dead fish covered an adjacent parcel.

During the 1960's and early 1970's, dumping of suspected hazardous material occurred on site. Four mounds of trash were left along a former logging road in a remote area in the hills west of the mill. The Dutchess County Health Department

FIGURE 1-1 SITE LOCATION MAP ATLANTIC ASBESTOS PHASE II INVESTIGATION





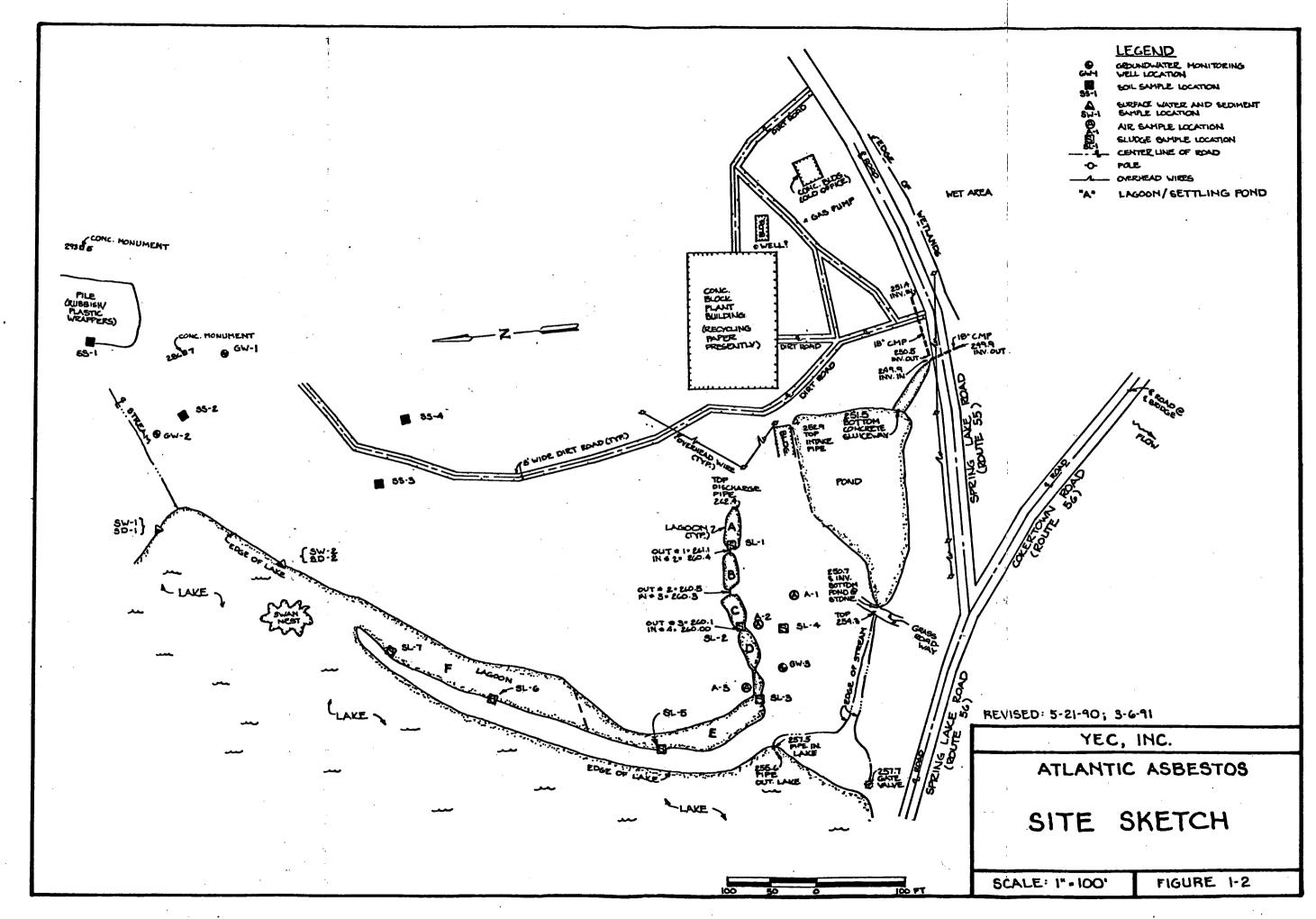
SITE COORDINATES:

LATITUDE: 420 1' 9.6" LONGITUDE: 730 49' 15"

SCALE:1:24000 1-2 QUAD.:CLERMONT (USGS, 1963)

7000 FEET

3000



found asbestos piles in the vicinity of the lagoons on April 15, 1977. On April 14, 1980, NYSDEC identified Atlantic Asbestos in a Hazardous Waste Disposal Site Report for the first time. In July, 1980, ownership of the land and its buildings changed hands to Barry Hull.

In the summer of 1986, a site investigation by NYSDEC found open bags of asbestos stored near the mill building. The asbestos had been removed from storage in the mill building after a fire in 1982. At NYSDEC's insistence, Red Hook Paper arranged for the proper storage and subsequent removal by Coachman Carting of Port Jervis, New York to an approved disposal site on August 27, 1987.

The Phase II activities included:

- o Background records search and site assessment:
- o Screening of on-site air quality;
- o Exploratory boring and monitoring well installation;
- o Subsurface hydrogeologic characterization;
- o Groundwater, surface water, air and sediment sampling and analysis;
- o Surveying; and
- o Evaluation of Phase II data.

No HRS computation was conducted for this investigation.

Results of the Phase II investigation indicate the presence of asbestos, 2-methylnaphthalene, naphthalene, toluene, xylene (total), and chloroform in some sludge samples taken from settling lagoons on site. Chrysotile asbestos content in 7 sludge samples ranged in concentration from 67% to less than 1%. Asbestos content increased in samples that were further downstream from the effluent pipe and in areas of very slow current. It is possible that solvents or lubricants used in the paper recycling process are being introduced to the surrounding surface water and, subsequently, New York State-designated wetlands through the effluent pipe.

Samples taken closest to the effluent pipe of the mill contained much greater concentrations of volatiles and semi-volatiles than samples taken further downstream. Sample SL-1 contained the highest concentrations of 2-methylnaphthalene, toluene and xylene, but less than 1% asbestos. 2-methylnaphthalene was also detected in surface water. In monitoring wells installed onsite, iron and manganese were detected in concentrations above New York State's Ambient Water Quality Standards and Guidance Values for class GA groundwater.

Based on the results of this investigation, it is recommended that additional investigations be conducted at the site, including:

- 1) A grid sampling and retesting of the lagoons to determine the extent of asbestos contamination.
- 2) Additional testing of the sediment from the lake and pond and the adjacent wetlands. Samples should be taken in the vicinity of high water marks near the culvert that enters the wetland from the small pond onsite.
- 3) The determination of the nature, extent and quantity of contaminated sludge and sediment. This should include locating sludge that had been buried onsite by Atlantic Asbestos, Inc.
- 4) Resampling of the air in the vicinity of the lagoons for asbestos fibers.
- 5) A study be undertaken to create a plan for disposal of the sludge.

2.0 PURPOSE/OBJECTIVES

Under contract to Lawler, Matusky and Skelly Engineers, Inc. (LMS), who is in turn under contract to the New York State Department of Environmental Conservation (NYSDEC) Superfund Program, YEC, Inc. conducted this Phase II investigation at the Atlantic Asbestos Site. The purpose of this Phase II Study was to address specific concerns regarding past illegal waste disposal practices, and to provide information for calculating a Hazard Ranking Score (HRS). This assessment will be used to determine what additional actions, if any, should be conducted at the site. A NYSDEC-approved Phase II Work Plan was developed and implemented which, to the extent designed, has provided information to assist in the attainment of project objectives. These objectives included:

- (1) Providing a preliminary geologic and hydrogeologic site assessment;
- (2) Identifying and evaluating the potential presence and nature of contamination;
- (3) Evaluating the environmental significance based on (1) and (2);
- (4) Providing additional information for scoring the site utilizing the Mitre Model Hazard Ranking System (HRS); and
- (5) Preparing a report document which is in accordance with NYSDEC's Phase II report format.

3.0 SCOPE OF WORK

The scope of work for the Phase II investigation included the following:

- o Record Search
- o Air Monitoring
- o Subsurface Investigation
- o Monitoring Well Installation
- o Sampling and Analysis
- o Site Surveying

Details of the specific items involved in this program are summarized in the following sections.

3.1 RECORD SEARCH

Record searches, data compilations and interviews were conducted as part of the Phase II investigation at the Atlantic Asbestos Site. A list of agencies and individuals contacted is included in Appendix B.

3.2 AIR MONITORING

Prior to the start of the various field investigation activities, an initial screening of ambient air quality on site was conducted using a HNU photoionization detector. A HNU photoionization detector was maintained on site during all field activities. A MIE PDM-3 Miniram dust, aerosol, and mist monitor was also present during drilling operations to detect any dust levels above background that could be resulting from dumped or buried asbestos. For initial screening purposes, the site was traversed and air quality readings were recorded. Measurements were also taken periodically

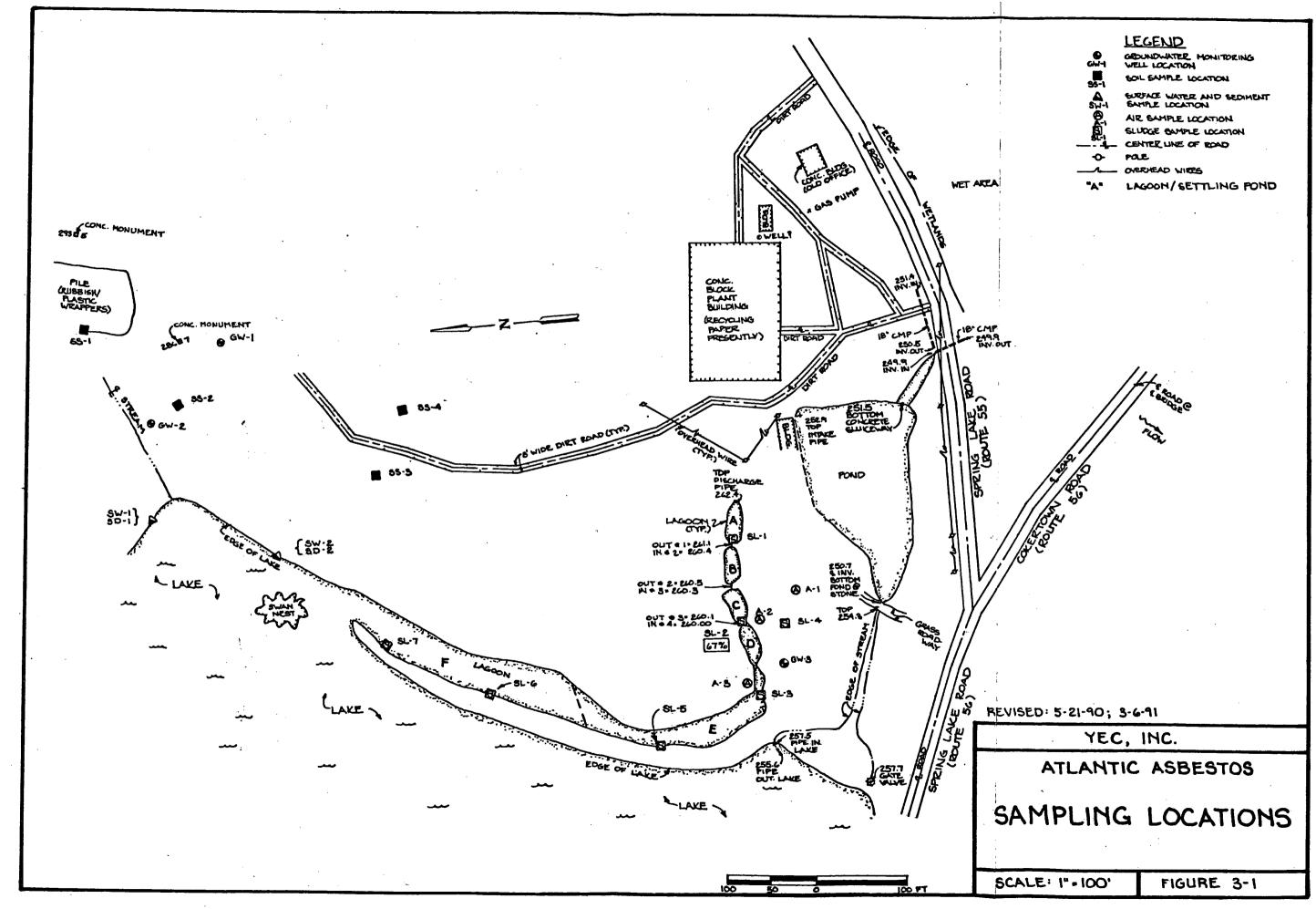
during other field activities. The Miniram was an automatic calibrating model that zeroed itself whenever the unit was activated. Calibration of the HNU was performed daily.

3.3 SUBSURFACE INVESTIGATION/WELL CONSTRUCTION

The Phase II Investigative program was conducted (1) to determine the effects of waste dumping on the environment, and (2) to determine the immediate extent and magnitude of contamination based on site specific hydrogeologic conditions. To facilitate these determinations, three subsurface borings were advanced at the locations shown on Figure 3-1, with subsequent installation of groundwater monitoring wells (GW-1 through GW-3). Monitoring well locations were selected to insure well placement both up and downgradient relative to possible contaminant plumes.

The boring/rock coring program was conducted during the period of February 5, 1990 through February 28, 1990, with the assistance of Associated Drilling Company of Meriden, Connecticut. Drilling was accomplished with two rigs, a CME-45 track-mounted and a CME-75 truck-mounted drill rig. Soil borings were advanced with 4 1/4" inside diameter (I.D.), continuous flight, hollow stem augers (HSA). Rock coring employed NX core barrel and rock was bored out with 3 5/8" and 5 15/16" roller bits. The drill rig, augers, and all drilling tools were decontaminated with high pressure steam between borings.

Monitoring wells were constructed in completed borings to monitor the saturated zone in overburden or bedrock. The site is underlain with only a veneer of soil covering highly deformed phyllitic shales. Bedrock is incompetent in the shallow depths where drilling took place. Quartz veins cross-cut the shales' cleavage planes at several different attitudes. Water moving through the fracture zones in the shale caused mineral dissolution leaving large voids in the bedrock. Because of these



circumstances, neither wells 1 nor 3 could be constructed as a standard NYSDEC rock well. Instead, the wells were constructed using two inch PVC screens and riser pipe.

While augering, representative soil samples were obtained from all appropriate borings with 2 foot long, 1 3/8 inch I.D. split spoon samplers. Standard penetration test measurements were recorded for each sampling attempt in accordance with ASTM-D-1586. Spoons were driven ahead of the augers beginning at the surface and continuing every five feet through unsaturated strata. Spoons were driven continuously upon encountering the saturated zone. Soil samples were collected to insure a sufficient quantity of sample for geotechnical analysis and to permit an accurate analysis of the natural unconsolidated deposits of the area. All soil samples collected were placed in pre-cleaned 500 ml glass jars and sealed with Teflon liners and screw-on caps. At the sites for GW-1 and GW-3, soil consisted almost entirely of partially-weathered bedrock of coarse gravel or greater grain size. Due to the dearth of suitable soil, only one sample was selected for geotechnical analysis and relinquished under chain of custody to Buffalo Drilling Company of Buffalo, New York for grain size analysis.

Upon recovery, each split spoon sample was inspected for any visual signs of contamination, characterized for material physical properties, visually identified (ASTM-D-2488), and monitored for volatile organic compounds with a HNU. Information on sample identifications and descriptions was recorded on subsurface boring logs, which are presented in Appendix C. More detailed descriptions of site-specific geology and subsurface characteristics are presented in Sections 4.3 and 4.4.

As with soils, upon recovery, each rock core sample was inspected for any visual signs of contamination and monitored for volatile organic compounds with a HNU. A Rock Quality Determination characterized physical properties. Information on sample identifications and descriptions was recorded on subsurface boring logs, which are presented in Appendix C. More detailed descriptions of site-specific geology and subsurface characteristics are presented in Sections 4.3 and 4.4.

3.3.1 TEST BORING/CONSTRUCTION OF GW-1

Drilling of the upgradient well GW-1 began on February 7. The track-mounted CME-45 attempted to advance with 4 1/4 i.d. hollow stem augers during February 7 and 8. With NYSDEC approval, a total of 6 attempts were undertaken at 5 different locations, as far as 250 feet from the original site chosen for GW-1 The deepest penetration was to 4 feet. As auger refusal was met, each boring attempt was backfilled with cuttings. These unsuccessful attempts caused NYSDEC to alter the work plan, which originally called for overburden wells, and for the sub-contractor to drill a NYSDEC-designed rock well.

On February 19, rock drilling in the area designated for GW-1 began. The CME-45 was equipped with a 5 15/16" diameter roller bit to drill to a depth of 4 1/2 feet. Using this large bit permitted easy placement of a protective steel casing and concrete seal when the well was constructed.

Rock drilling used a tremendous quantity of water due to the highly fractured rock, which prevented retention of water in the borehole. Coring with NX began at 4.5 feet and continued down to 28 feet. Consumption of purchased water while drilling GW-1 was approximately 5500 gallons. A static water level of 21.72 feet below ground surface (bgs) was recorded in the borehole late afternoon on Feb. 23. On Feb. 28, the level stabilized at 22.2 feet below ground surface after bailing 10 gallons.

Although the borehole held only 6 feet of water, NYSDEC approved construction of a monitoring well drilled to 28 feet. Since RQD's (Table 3-1) for these cores ranged from very poor (13%) to fair (62%), an open rock well was unfeasible. An overburden-style monitoring well was installed after roller-bitting the borehole with the 3 5/8 inch diameter tri-cone bit. Roller-bitting was used to provide a greater annulus around the screen and riser for the placement of a sand pack and bentonite pellets without bridging the borehole created by the NX core bit. Though the sand

TABLE 3-1 ATLANTIC ASBESTOS ROCK QUALITY DETERMINATIONS (RQD)

WELL #	CORE INTERVAL (FT)	RQD (%)	RQD (RATING)
GW-3	9.5-12.0	15%	Very poor/Highly fractured
	12.0-16.5	7%	Very poor/Highly fractured
	16.5-21.0	50%	Fair
GW-1	4.5-7.5	13%	Very poor/Highly fractured
	7.5-12.5	62%	Fair
	12.5-17.5	39%	Fair
	17.5-22.5	56%	Fair
	22.5-27.5	25%	Very poor/Highly fractured

NOTE: Fractures caused by the core barrel must be distinguished from natural fractures. Pieces > 4" but fractured by the core barrel are NOT CONSIDERED in the RQD determination.

RQD(%) = (Total Length of Pieces > 4 Inches in Length/Total Recovery of Core Interval)

RQD SCALE

0%-25% VERY POOR/HIGHLY FRACTURED
25%-30% MODERATELY FRACTURED-POOR
30%-75% FAIR
75%-90% GOOD/SLIGHTLY FRACTURED
90%-100% EXCELLENT

YEC, INC. 1990

itself was not needed in a screened rock well, NYSDEC required a bentonite seal above the static water level, necessitating the use of a sand pack to support it. Several inches of #1 New Jersey silica sand were placed in the bottom of the boring. Screen was installed at approximately 28 below grade to 18 feet below grade. More sand pack was placed around the screen to a depth of 15 feet. Bentonite pellets were placed around the riser from 15 to 13 feet below ground surface (bgs). The pellets were then hydrated. A grout mix of water, portland cement and powdered bentonite was placed over the pellets. The grout was poured to approximately 2 to 2 1/2 feet bgs, where it interfaced with the concrete topseal. A 5 foot length of 4 inch i.d. protective steel casing with a hinged locking cap was placed over the PVC riser pipe and set into the concrete and bentonite pellets to a depth of approximately 2 1/2 feet. The PVC cap was vented to allow equilibration of static water levels with barometric pressure. Concrete was then mounded around the protective steel casing at ground surface to prohibit accumulation of surface water around the well.

3.3.2 TEST BORING/CONSTRUCTION OF GW-2

Drilling of GW-2 began on February 6, 1990. The location designated by NYSDEC for GW-2 was in the vicinity of the intermittent stream that flows into the northwest corner of the large pond. A former logging trail in the woods, uphill and west of the mill building was cleared of timber to gain access to GW-2.

In position at GW-2, Associated Drilling's track-mounted CME-45 drill rig, using 4 1/4 inch i.d. hollow stem augers, advanced to a depth of 9 1/2 feet bgs before refusal. Wet soil was encountered almost immediately after the auger head pierced the ground surface. After considering subsurface conditions, NYSDEC approved the construction of an overburden well with just five feet of screen.

Monitoring well GW-2 was constructed on February 7. A five foot section of 0.01 inch (#10) slot PVC well screen with an end cap was attached, via an interior-

threaded coupling, to a ten foot length of two inch i.d. capped schedule 40 PVC riser pipe. This pipe was then lowered into the borehole, screened interval first, through the augers and centered in the borehole with the bottom of the screen at a depth of approximately 9 1/2 feet bgs, atop several inches of #2 New Jersey silica sand. As the auger flights were withdrawn from the borehole, more #2 sand was then placed in the annular space around the screen and riser to a level 1 foot above the top of the screen (approximately 4 1/2 feet bgs). A seal of hydrated, 3/8 inch diameter bentonite pellets was placed above the sand pack to prohibit downward migration of surface water from entering the screened interval. These pellets were poured to approximately 2 to 3 1/2 feet bgs, where they interfaced with the concrete topseal. A 5 foot length of 4 inch i.d. protective steel casing with a hinged locking cap was placed over the PVC riser pipe and set into the concrete and bentonite pellets to a depth of approximately 2 1/2 feet. The PVC cap was vented to allow equilibration of static water levels with barometric pressure. Concrete was then mounded around the protective steel casing at ground surface to prohibit accumulation of surface water around the well. Specific construction details for each well are presented in Appendix C.

3.3.3 TEST BORING/CONSTRUCTION OF GW-3

Drilling of GW-3 began on February 13. After augering through 10 feet of weathered bedrock, the NX core barrel was advanced through highly fractured, incompetent shale. On February 19, after having cored to 17 feet, an equilibrated static water level was recorded at approximately 12 feet. As the water level remained static after coring to 22 feet, NYSDEC approved construction of a monitoring well in the borehole.

RQD's (Table 3-1) for GW-3's cores ranged from very poor to fair, necessitating the construction of GW-3 in the manner of an overburden well on February 21. Although the annulus around the 2 inch i.d. PVC screen and riser was only 3/4 inch, sand pack was placed without widening the borehole with the approval of the

NYSDEC representative. Several inches of #1 New Jersey silica sand were placed at approximately 22 feet bgs. Screen was installed from 21 1/2 to 11 1/2 feet bgs. More sand pack was placed around the screen to a depth of 10 feet. Bentonite pellets were placed around the riser from 10 to 8 feet bgs. The pellets were then hydrated. A grout mix of portland cement and powdered bentonite was placed over the pellets. The grout was poured to approximately 2 to 2 1/2 feet bgs, where it interfaced with the concrete topseal. A 5 foot length of 4 inch I.D. protective steel casing with a hinged locking cap was placed over the PVC riser pipe and set into the concrete and bentonite pellets to a depth of approximately 2 1/2 feet. The PVC cap was vented to allow equilibration of static water levels with barometric pressure. Concrete was then mounded around the protective steel casing at ground surface to prohibit accumulation of surface water around the well.

3.4 WELL DEVELOPMENT

Monitoring wells (GW-1 through GW-3) were developed during the period of February 9 to March 1, 1990. Development was accomplished by surging and bailing with a dedicated PVC bailer attached to a 1/4 inch diameter nylon rope to loosen and remove silt and clay smeared on the screen and core hole during auger withdrawal or to remove fines created during coring.

Development of monitoring well GW-2 did not achieve the expectations (turbidity < 50 NTU's) outlined by the NYSDEC work plan within the time allotted. This may be caused by the well's proximity to the large pond and also the nature of the material in the screened interval.

Discharge water was constantly monitored. A ten quart (2.50 gallon) measuring bucket was utilized to attain measurements for the discharge rate, accurate to 0.1 gallon per minute. An electronic water level indicator and an engineer's tape were used to measure water levels to within 0.01 foot (see Table 3-3). The volume of water

evacuated, its appearance, pH, specific conductance, temperature, and turbidity were measured and recorded. Details of well development are presented in Appendix D.

3.5 HYDRAULIC CONDUCTIVITY TESTING

Hydraulic conductivity testing was performed on each well (GW-1, GW-2 and GW-3) on March 2, 1990. This was accomplished by performing in-situ rising head and falling head slug tests. The procedure incorporated the injection of a steam cleaned steel slug (42.5" in length and 1 3/8" in diameter) of known volume into the well, and subsequent monitoring of the water level, as it returned to static level, using a RocTest Model CPR6 electronic water level indicator. In performing slug tests, it should be noted that "near well bore effects" caused by the sandpack surrounding the screen can affect slug test results, because the test does not incorporate the withdrawal of water from the well.

The subsequent data analysis for hydraulic conductivity determination involved techniques provided in "Seepage, Drainage and Flow Nets", 2nd Edition by Harry R. Cedergren. These techniques are intended for an observation well in saturated isotropic stratum of infinite depth where the radius of the intake point differs from the radius of the standpipe (Case C) (Appendix A, Ref. 3). For rising and falling head slug tests, the log of the head ratio (H_T/H_0) (dependent variable) is plotted with respect to the elapsed time (t) (independent variable). A simple linear regression was used to analyze the data and fit the best line to the plot of points for each well. From the resulting plot, the two values of the head ratio (H_T/H_0) can be determined at a start and end time (t_1 and t_2), and these values are known as H_1 and H_2 , respectively. With these four values determined for a well the hydraulic conductivities can be calculated, as shown in Appendix E.

The values calculated for GW-1 and GW-2 (Table 3-2) correspond well with published values of hydraulic conductivities for the material in which the wells

TABLE 3-2 ATLANTIC ASBESTOS HYDRAULIC CONDUCTIVITY (K) VALUES

WELL NUMBER		HYDRAULIC CONDUCTIVITY (cm/s)	
GW-1	RISING HEAD	5.01 X 10^-4	
	FALLING HEAD	8.34 X 10 ⁻⁴	
GW-2	RISING HEAD	3.58 X 10 ⁻⁴	
	FALLING HEAD	2.18 X 10 ⁻³	

TABLE 3-3 ATLANTIC ASBESTOS MONITORING WELL CASING ELEVATIONS

WELL I.D.	STEEL CASING ELEVATION (FT ABOVE SEA LEVEL)	*PVC CASING ELEVATION (FT ABOVE SEA LEVEL)	GROUND ELEVATION (FT ABOVE SEA LEVEL)	STICKUP OF STEEL CASING (FT)	STICKUP OF PVC ** CASING (FT)
GW-1	294.44	294.42	292.03	2.41	2.34
GW-2	266.72	266.49	263.60	3.12	2.84
GW-3	265.94	265.90	263.71	2.23	2.14

GROUNDWATER ELEVATIONS (FEET BELOW THE LAND SURFACE) GW-1, GW-2, GW-3

GROUNDWATER ELEVATIONS (FEET ABOVE SEA LEVEL)+ GW-1, GW-2, GW-3

DATE	GW-1	GW-2	GW-3	GW-1	GW-2	GW-3
02/09/90	•	0.36	-	-	263.24	-
		0.26	•		263.34	•
02/13/90	-	0.26	•	-	263.34	•
02/19/90	-	0.36	-	•	263.24	•
02/20/90	•	0.46	11.73	•	263.14	251.98
02/23/90	18.98	•	-	273.05	-	-
	20.56	•	•	271.47	•	-
02/26/90	19.69		11.61	272.34	•	252.10
02/27/90	20.11	•	•	271.92	-	•
02/28/90	20.14	•	11.73	271.89	•	251.98
3/01/90	-	0.96	11.67	•	262.64	252.04
3/02/90	22.30	1.01	•	269.73	262.59	•
	22.25	•	•	269.78	•	
	22.23	•	•	269.80	•	•
AVERAGE:	20.78	0.52	11.69	271.25	263.08	252.03

^{(-) =} Measurement not taken at time.

 ^{(*) =} Measurement taken at the top of the PVC top cap.
 (**) = A uniform distance of .05 feet was subtracted from this number because measurement during surveying was not done with the bubble cap off, whereas water level measurements were taken from the edge of the PVC pipe with the cap off.
 (+) Based on an assumed elevation above sea level from USGS topographic quadrangle map.

were screened. GW-1, which was screened in fractured rock from 28 to 18 feet, was determined to have a hydraulic conductivity of 8.34 X 10⁻⁴ cm/s, a value characteristic of fractured rocks (Appendix A, Ref. 4). GW-2, screened from 9 1/2 to 4 1/2 feet in clayey sand, has a hydraulic conductivity of 2.18 X 10⁻³ cm/s, comparable to values assigned to silty sand (Appendix A, Ref. 5). GW-3, screened from 21 1/2 to 11 1/2 feet in highly fractured rock, has an extremely high hydraulic conductivity. Repeatedly, during slug tests of this well, the static water level recovered so rapidly it was not possible to determine any change in the level with the instruments used.

Overall, correlation between the calculated conductivity values and the published conductivity values of the material found in the screened intervals corroborated by the boring logs is very good. The conductivity values are illustrative of the nature of the screened materials.

3.6 <u>SAMPLING AND ANALYSIS</u>

The following procedures describe the sampling and analysis of groundwater, surface water, sediment, air, sludge, and soil samples from the subsurface investigation. Subsequent to the installation and development of the monitoring wells, samples were collected during the period of February 19, 1990 through March 2, 1990, for analysis of the parameters indicated on Table 3-4. See Figure 3-1 for sampling locations.

3.6.1 <u>ASBESTOS AIR SAMPLING</u>

Air sampling for the presence of asbestos in the atmosphere was conducted using three Alpha 1 constant flow vacuum pumps equipped with 25mm filters. The pumps were designed to ensure constant flow regardless of load variations or other factors that would affect flow rate.

TABLE 3-4 SAMPLING PROGRAM SUMMARY ATLANTIC ASBESTOS

MEDIA	TCL METALS	TCL VOLATILES	TCL SEMI-VOLATILES	TCL PEST/PCB	*ASBESTOS	SPIKE/DUP	WET LAB	TOTALS
GROUNDWATER (+)	4	4	4	4	-	1/1	4	6
SURFACE WATER	2	. 2	2	2	2	-	2	2
SEDIMENT	2	2	2	2	2		-	2
SLUDGE	4	4	4	4	4	-	- ′	4
SLUDGE	-	-	_	-	3	_	_	3
SOIL	4	4	4	4	-	1/1	٠ ـ	6
AIR	-	-	-	-	4 (**)	-	-	3
FIELD BLANK	1 .	1	* 1	1		· :	_	-
TRIP BLANK	_	1		_	_	_	_	_

NOTE: SEE PLATE A FOR MONITORING WELL AND SAMPLING POINT LOCATIONS.

NOTE: SEE PLATE A FOR MONITORING WELL AND SAMPLING POINT LOCATIONS.

TCL = TARGET COMPOUND LIST
WET LAB = TDS, TSS, COD, pH, and CONDUCTIVITY

SPIKE/DUP, TRIP BLANK, FIELD BLANK) - (SEE APPENDIX G FOR EXPLANATION).

AIR SAMPLING - (SEE SECTION 3.5 FOR METHOD DESCRIPTION).

*Asbestos - For surface water samples a modified .45 micron TSS analysis was used to detect fiber concentrations (see section 3.5.3 for complete description of procedure).

** - Asbestos air sampling total also includes a blank sample.

(+) Groundwater sample includes a blind QA/QC sample in addition to the three well samples.

TABLE 3-5 ATLANTIC ASBESTOS ASBESTOS AIR SAMPLING SUMMARY TABLE

PUMP # LOCATION		RUNNING TIME (HRS)	AIR VOLUME (LITERS)	FIBERS (fibers/cc)
1	Downwind	6	1440	NO FIBERS DETECTED
2	Downwind	6	1434	BDL* (.001 f/cc)
3	Upwind	6	1425	BDL* (.001 f/cc)
Blank	Blank	0		NO FIBERS DETECTED

^{*} Below Detectable Limit (Less than 5.5 Fibers Per 100 Fields).

TABLE 3-6 ATLANTIC ASBESTOS SAMPLE COLLECTION SUMMARY

SAMPLE #	DATE COLLECTED	TIME COLLECTED	рН	COND.	TEMP.	NTU
GW-1	03/02/90	1220	7.46	273	9.0	14
GW-2	03/01/90	1304	6.85	180	5.8	>200
GW-3	03/01/90	1130	6.78	186	7.4	16
GW-4	03/01/90	1130	6.78	186	7.4	16
SD-1	02/14/90	1319	NA	NA	NA	NA
SD-2	02/14/90	1325	NA	NA.	NA	NA
SW-1	03/02/90	1145	7.25	227	6.7	NA
SW-2	03/02/90	1252	7.39	219	6.9	NA
ss-1	02/14/90	1143	NA	NA	NA	NA
ss-2	02/14/90	1127	NA	NA	NA.	NA
ss-3	02/14/90	1052	NA	NA	NA	NA
SS-4	02/14/90	1025	NA	NA	NA	NA
SL-1	02/14/90	1140	NA	NA	NA	NA
SL-2	02/14/90	1120	NA	NA	NA	NA
SL-3	02/14/90	1105	NA	NA	NA	NA
SL-4	02/14/90	1055	NA	ŇA	NA	NA
SL-5	02/14/90	1045	NA	NA	NA	NA
SL-6	02/14/90	1035	NA	NA	NA	NA
SL-7	02/14/90	1025	NA	NA	NA	NA

NA - Not applicable

The pumps were preprogrammed at a constant flow rate of four (4) liters per minute. They were field calibrated with a bubble tube prior to start up and were run continuously for 6 hours.

The wind direction and velocity were monitored during the sample collection period at 15 to 20 miles per hour from a northwesterly direction. Skies were clear with temperatures ranging from 25 to 30 degrees Fahrenheit. The exposed settling lagoon dredge piles were frozen due to sub-freezing temperatures prior to and during the air sampling.

Pump #1 was placed downwind of the exposed settling lagoon dredge pile near SL-4. Pump #2 was placed downwind of the dredge pile adjacent to settling lagoon C. Pump #3 was placed upwind of settling lagoon E. A fourth pump was on site but not activated. The filter was marked as sample #4 and returned to the laboratory as a field blank for quality control. Sampling details are highlighted in Table 3-5.

3.6.2 GROUNDWATER

Following development and equilibration of water levels within the three newly installed wells, representative groundwater samples were collected. Each well was purged of four borehole volumes before sampling. Dedicated PVC bailers were employed to purge and sample each well. Field measurements for pH, temperature, and specific conductivity were recorded upon recovery of samples (see Table 3-4). Samples were then placed in their appropriate containers, labelled, chilled to approximately 4° C, and stored in a cooler prior to shipment.

Turbid groundwater specimens (NTU > 100) scheduled to be analyzed for metals required special processing before shipment. Each one was filtered for suspended solids with an apparatus consisting of a vacuum pump, tubing, filter paper, and filter flask.

An eighty-quart capacity, steel Coleman cooler was used to protect the specimen containers during shipment to the laboratory via Federal Express. Samples for chemical analysis and appropriate chain of custody forms were delivered concurrently to Aquatec, Inc. of South Burlington, Vermont. Details of groundwater sampling are presented in Tables 3-4, 3-6 and 4-1.

3.6.3 SURFACE WATER

The NYSDEC work plan was amended with respect to surface water sampling. Originally, a total of 4 samples were to be taken, 2 from the intermittent stream in the vicinity of GW-2 and 2 in the vicinity of the lagoon mouth. The intermittent stream samples were omitted as it was felt by the NYSDEC representative onsite that the stream was purely the result of snowmelt and would not yield pertinent information if chemically analyzed.

In order to develop an understanding of the extent, magnitude and possible pathways of migration by the dumped substances and the mill's industrial waste, two surface water samples were taken from the northwest side of the lake, near the mouth of the lagoon. Field measurements for pH, temperature, and specific conductivity were recorded upon recovery of samples (see Table 3-4). Analysis was performed using the chemical parameters specified in Table 3-6. Samples were collected directly into pre-cleaned containers. The same protocols for field measurements and preservation utilized in the sampling of groundwater were applied for the collection of surface water samples.

3.6.4 SEDIMENT

Two sediment samples (SD-1 and SD-2) were collected from the vicinity of each surface water sample. This was achieved with a two inch I.D. stainless steel hand

auger. In each case, sediment was extracted from the upper two feet of the lake floor.

Upon recovery, samples were placed in pre-cleaned, 250 or 500 ml glass jars, labelled, chilled, and delivered to Aquatec, under chain of custody, for subsequent analysis for the parameters listed in Table 3-4.

3.6.5 **SLUDGE**

Seven sludge samples were taken using a two inch diameter stainless steel hand auger and a stainless steel hand shovel. Material was extracted from the upper 2 feet of each of the 6 unlined lagoons labelled A through F and to a depth of 6 inches from the exposed settling lagoon dredge matter (SL-4).

Sludge sample #1 was taken from settling lagoon A, the lagoon into which an effluent pipe directly empties wastewater from the mill. Sludge sample #2 was extracted from the downstream lagoon lettered C, about 100 feet from sampling location #1. A sludge sampling point (SL-3) 85 feet downstream from location #2 from lagoon E was also sampled. Sludge sampling point #4 was extracted from the exposed dredged sludge pile which is located on dry land about 45 feet southwest of sampling point #2 and southeast of lagoon D. Sample SL-5 was taken along the peninsula and around the bend about 130 feet downstream from sample location #3 from lagoon E. Sludge sample #6 (SL-6) was acquired from the bottom of the stream bed about 200 feet from the mouth also from lagoon F. Sludge Sample #7 (SL-7) was taken in the stream along the peninsula about 40 feet from the mouth, also from lagoon F.

Upon collection, samples were placed in pre-cleaned 250 or 500 ml glass jars, labelled, chilled, and delivered to Aquatec, Inc., under a chain of custody for subsequent analysis for the parameters listed in Table 3-4. Additional sampling information is found in Table 3-6.

information is found in Table 3-6.

3.6.6 **SOIL**

Soil samples were taken for both chemical and geotechnical analysis. One subsurface soil sample was analyzed for physical parameters (Grain Size or Atterberg Limits) in an attempt to characterize the composition and nature of the unconsolidated materials within the site area. It was selected to represent the various subsurface materials encountered on site and from subsurface intervals of interest. In addition, a total of four (SS-1 through SS-4) composite soil samples were collected at four locations. Soil sample SS-1 was taken at the large waste pile, while SS-2 was taken downgradient from SS-1 adjacent to GW-2. SS-3 and SS-4 were recovered from points downgradient of two smaller waste piles. All composite soil samples were acquired using a stainless steel hand shovel from the first six to twelve inches below ground surface. Upon collection the samples were placed into cleaned glass jars, labeled, chilled and sent to Aquatec, Inc. under chain of custody, for subsequent analysis for the parameters listed in Table 3-4. Sampling locations are illustrated on Plate A, located in the back pocket of this report.

3.6.7 ASBESTOS ANALYTICAL METHODS

<u>AIR</u>

Laboratory analysis for asbestos in air was performed by Shelbourne Laboratories, which is accredited under section 206 (d) of Title II of the USC chapter 15, TSCA as stated in 40 CFR763, April 30, 1987. The analytical method employed (7400) was an approved National Institute Occupational Safety and Health (NIOSH) procedure for Proficiency Analytical Testing (PAT) for counting asbestos fibers. Analysis was performed by Phase Contrast Microscopy (PCM) using an Olympus CH-2 microscope at 400x magnification. PCM fiber counting is based on particulate size

and shape, and is not intended as a means of identification. All fibers having a length to width ratio of five (5) microns or greater are counted. For a detailed explanation of analytical procedure 7400, see Appendix I. Asbestos air sampling data and results are reported in section 4.6.1.

SEDIMENT AND SLUDGE

The sediment and sludge samples were analyzed for asbestos by Shelbourne Laboratories, which is accredited as mentioned above. The samples were analyzed by Polarized Light Microscopy (PLM) employing the Stratified Point Counting Technique for Identifying and Quantifying Asbestos in Bulk Samples. The samples were analyzed to determine if asbestos was present at concentrations greater than 1 percent. They were homogenized and portions were dried in a drying oven at 50 degrees centigrade (122 degrees Fahrenheit) for 16 hours prior to analysis. For a detailed explanation of the analytical procedure used see Appendix I. Data and analytical results for asbestos in sediment and sludge are reported in sections 4.6.2.

SURFACE WATER

Two surface water samples were analyzed by Aquatec Inc. using a modified Total Suspended Solids procedure. This gravimetric test measured both asbestos and non-asbestos residue retained on a 0.45 micron filter. A portion of the mixed sample was filtered through a pre-weighed 0.45 micron cellulose and acetate filter. The filter was dried at 105 degrees centigrade (221 degrees Fahrenheit) for a prescribed period of time before reweighing and calculation of the residue weight. The reporting limit for this test is 100 mg/l (<0.01%) For a detailed explanation of the analytical procedure used, see Appendix I. Surface water data and analytical results for asbestos are reported in section 4.6.3.

3.6.8 CHEMICAL ANALYTICAL METHODS

The procedures utilized for chemical testing of water and sediment specimens

collected during the Phase II investigation and analyzed by Aquatec, Inc. are summarized in this section. Each sample was analyzed for the compounds listed on the Target Compound List (TCL), using the Contract Required Quantitative Limits (CRQL) as guidance values in compliance with NYSDEC Superfund and Contract Laboratory Protocol dated November 1987 or USEPA Contract Laboratory Protocol statement of work for organic (9/88) and inorganics (12/87), as directed by NYSDEC (Appendix F). All semivolatile and PCB/Pesticide samples were extracted for analysis within five days of the date the laboratory received the samples for water samples, and within ten days for soil/sediment samples. The Target Compound List is subdivided into four sections which include: pesticides/PCBs, semivolatiles, volatiles, and inorganics. All samples were analyzed by Aquatec and validated by Data Validation Services of Riparius, New York, in accordance with NYSDEC 1987 Contract Laboratory Protocols (CLP). Data Validation Services declared that "All samples were found to be in compliance for all parameters." However, some matrix spike recoveries were outside of preferred ranges.

3.6.9 GEOTECHNICAL METHODOLOGIES

The geotechnical analysis of the one split spoon sample collected during the Phase II investigation was performed by Buffalo Drilling Co., Inc., Buffalo, New York. The soil sample for geotechnical evaluation was prepared and tested in accordance with procedures outlined in the American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards (Appendix G). The following standard test methods were utilized in whole or in part:

- o Particle Size Analysis (ASTM D422)
- o Moisture Content (ASTM D2216)
- o Classification of Soils for Engineering Purposes (ASTM D2487)

The soil tested was classified using the Unified Soil Classification System, which

classifies soils according to grain size distribution of the fraction less than three (3) inches in diameter, plasticity index, liquid limit and organic matter content, and also according to those properties that affect their use as construction materials. The soil sample (GW-2, SS#1) submitted by YEC, Inc. for testing received the classification CL (Lean Clay with sand). This classification was based on several parameters, such as, a liquid limit that is less than 50%, low to medium plasticity, and more than 50% of material passing through a #200 size sieve. The results of the geotechnical analysis showing the resulting moisture content, gradation analysis, sample description, and engineering classification are contained in Appendix G.

3.7 SURVEYING

A survey of locations and elevations of monitoring wells and sampling points was conducted by YEC, Inc., on April 13,1990. All horizontal distances and angles were measured using a Topcon GTS-3 Electronic Distance Meter. Well casing and ground surface elevations were determined utilizing a Topcon AT-F3 Differential Level Instrument.

Property lines were obtained from a Town of Red Hook Tax Assessment Map, 15-6373-00, dated January, 1990. Elevations were determined in feet above or below an assumed datum. An elevation of 263.0 feet was set for a point centerline of intersection of Spring Lake Road (Route 55) and Cokertown Road (Route 56), established at the time of the survey.

4.0 SITE ASSESSMENT

4.1 SITE HISTORY

From 1938 to 1970, the Ozurovich family owned the property (Appendix A, Ref. In 1946, the Atlantic Asbestos Corporation (under the leadership of John Ozurovich) began construction of a facility to manufacture paper containing asbestos fibers and a low grade shipping paper (Appendix A, Ref.1). Asbestos used in the operation process was obtained by utilizing virgin and reclaimed asbestos fibers (Appendix A, Ref.8). Two ponds (one large enough to be termed a lake and one only a small pond) were created on the property by excavating marshland and then filling the excavations with water. In 1950, the paper mill became operational with the completion of the so-called "closed loop water recycling system" (Appendix A, Ref. 2). The manufacturing process required a large amount of water to create pulp from which paper was made. Water for pulping was pumped into the factory from a small pond. Effluent from manufacturing flowed into a series of lagoons, and subsequently into a larger pond. From this pond, flow back into the smaller pond for reuse was controlled by a gate valve. If the smaller pond overflowed its banks, the runoff would proceed downhill, across Spring Lakes Road, and into the presently-designated New York State wetlands and Class B(t) Lakes Kill (Appendix A, Ref. 7).

The plant operated without incident for many years. No incidents occurred until after the death of Mr. Ozurovich in 1965. In 1970, the parcel changed hands from Mrs. Ozurovich to the Atlantic Asbestos Corporation.

In the spring of 1974, complaints by neighbors began. Joseph Focca claimed that the large pond on site was flooding his property during periods of high runoff. Besides flooding his garage, the neighbor complained that many dead fish were deposited on his land. Atlantic Asbestos maintained that the deluge was an Act of God which did not occur before the Dutchess County Department of Public Works (DCPW) resurfaced and widened nearby County Route 56. In a letter dated April 25, 1977, Walter J. Fenn, owner of Atlantic Asbestos, freely admitted that "high water

filled up the small pond and caused overflowing" (Appendix A, Ref. 8).

On numerous occasions from 1977 until his death, the Dutchess County Health Department (DCHD) investigated Mr. Focca's reports (Appendix A, Ref.2). No Health Department documents discovered support Mr. Focca's claims. Although Mr. Focca's claims were repudiated by the DCHD, their many trips to Atlantic Asbestos led them to discover uncovered asbestos in the vicinity of the lagoons on the premises on April 15, 1977. This information was then passed on to NYSDEC (Appendix A, Ref. 1).

On August 3, 1978, DCDH conducted a walk-through of the site, noting no violations. The plant was not in operation at the time. It was observed by the Inspector that the potential for flooding of adjacent waterways existed.

On August 8, 1979, at the request of a resident, DCHD took a bacteriological sample from nearby Spring Lakes. It was analyzed for total coliform. Results were less than 200 per plate, indicating that the lake was free of coliform bacteria contamination. Ironically, the complaint lodged by the resident regarded the possible presence of asbestos in the lake. On August 14th, 1979, Atlantic Asbestos was listed as a NYSDEC Reported Hazardous Waste Site. On October 17th, 1979, water samples were taken at 4 locations around the site. Analysis indicated that total suspended solids in the lagoonal effluent exceeded levels found entering sewage treatment plants.

As a result of the August sampling, on November 28, 1979, NYSDEC determined that a State Pollution Discharge Elimination System (SPDES) Permit for the mill was required. Levels of BOD (Biochemical Oxygen Demand) and suspended solids at the lagoonal mouth were determined to be too high. Treatment would be required prior to discharge from the mill. As part of the permit process, effluent monitoring, a weir and a gauging station were required to be built upstream of the culvert that drains into the wetlands adjoining Saw Kill Creek. Construction of the weir and gauging station were to be completed by March 30, 1981. To date, there is still no gauging station.

On April 14, 1980, NYSDEC identified Atlantic Asbestos for the first time in a Hazardous Waste Disposal Site Report.

On July 17, 1980 the land and its buildings were bought by Mr. Barry Hull. Mr. Hull intended to recondition the old plant and resume operations by recycling newspaper to produce cardboard under the name of Red Hook Paper. As he was initially unaware of the SPDES permit restrictions on his facility, Mr. Hull requested additional time to meet the permit requirements. On June 4, 1981, NYSDEC granted Mr. Hull until August 15, 1981 to complete the required construction. In July, 1982, the original facility was destroyed by fire.

On August 1, 1983, a Potential Hazardous Waste Site Preliminary Assessment Report of Atlantic Asbestos was completed by the United States Environmental Protection Agency.

On September 24, 1984, Wehran Engineering submitted the results of the Phase I Investigation for the Atlantic Asbestos site. Phase I data was not sufficient to produce a final score using the Hazard Ranking System (Appendix A, Ref. 8).

In the summer of 1986, a site investigation by NYSDEC found open bags of asbestos stored near the mill building. The asbestos had been removed from storage in the mill building after the fire. At NYSDEC's insistence, Red Hook Paper arranged for the proper storage and subsequent removal on August 27, 1987 by Coachman Carting of Port Jervis, New York to an approved disposal site (Appendix A, Ref.1).

4.2 SITE AREA CHARACTERISTICS

4.2.1 ENVIRONMENTAL SETTING

During the 1960's and early 1970's, dumping of suspected hazardous material

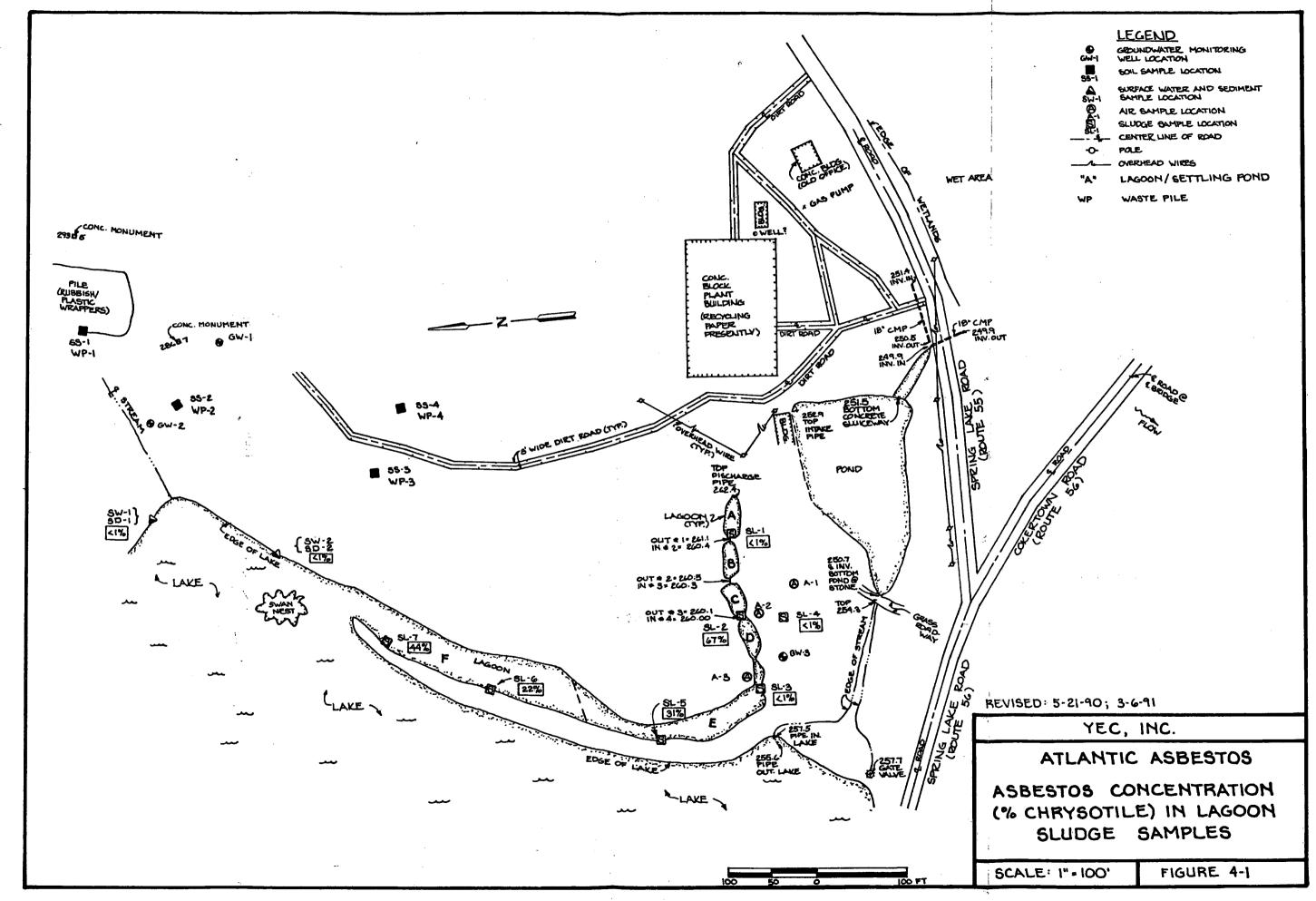
occurred at the site. This is presently distinguished by 4 mounds of trash located along a former logging road that runs north-to-south to the high ground overlooking the pond (see Appendix H).

Approaching the dumpsites from the south, on the logging road approximately 300 feet uphill from the mill, waste pile #4 is encountered. Approximately 15 one gallon paint/turpentine/wood preserver cans and household refuse were found. No sign of stressed vegetation is present.

Waste pile #3 is encountered on the west side of the road approximately 60 feet west of waste pile #4. Among its contents are 1 empty five gallon can of driveway sealer or roof tar and several empty one gallon paint cans. Tin beer cans are present, dating the pile to at least the early seventies. This pile is also slowly migrating downslope towards the pond. No sign of stressed vegetation is present.

Waste pile #2 is approximately 100 feet north of waste pile #3, also on the south side of the surveyor's/logger's road. This pile is the largest on site, measuring 150 feet long and 5 to 20 feet wide. Among the objects found were: a refrigerator; a rusted 55 gallon open top steel drum; tar paper shingles; household trash; an automobile anti-freeze container; tires; and aluminum cans commemorating the 75th (seventy-fifth) anniversary of Pepsi-Cola. The soda cans date the trash as having been dumped as early as 1973. This pile is also slowly migrating down slope towards the pond. No sign of stressed vegetation is present.

Approximately 50 feet northeast and downhill of waste pile #2 is waste pile #1. A concrete benchmark is approximately 20 feet to the south. This pile is smaller than #2 and contains additional household refuse, a five gallon container of pure asphalt, petroleum spirits and long asbestos fibers, a similar, but unlabeled container with a tarry substance adhered to its outside, five rusted one gallon paint containers, and numerous plastic containers of bleach and antifreeze with and without their caps. This pile is migrating down slope faster than the rest due to the steeper slope. No



sign of stressed vegetation is present.

A surface water system incorporating an effluent pipe from the paper mill, several lagoons and a lake and small pond serves to disperse paper waste derived from the mill. The effluent pipe empties into a series of lagoons that serve as crude settling ponds. Not all of the effluent settles out in the lagoons. A delta composed of grey paper waste and rotting organic matter has formed at the interface of the lake and the final lagoon. The same grey material was noticed floating on the pond during the time of surface water sampling.

Sludge from the lagoons has been analyzed and found to contain asbestos, PCB's, 2-methylnaphthalene, toluene, xylene, chloroform and naphthalene. All of these may be attributable to the product produced in raw or finished form, or to lubricants used on the machinery used to create the recycled paper. Not all sludge samples contained each of these substances. In some cases, concentrations were extremely low. Nevertheless, xylene and toluene in this form are currently listed as hazardous wastes in 6 NYCRR 371.4(b). A detailed discussion of the analysis of the sludge follows in Sections 4.5.7 and 4.6.2.

The lake spills over into a small stream which feeds the small pond. This smaller pond is used to supply the mill with water used during manufacturing. During periods of high water, the small pond drains into the Lakes Kill (also known as Saw Kill) (H-158), a Class B(T) stream (Appendix A, Ref. 9). The kill is the main supplier of water to two New York State-designated wetlands CM-12 and CM-26.

Water also flows from an intermittent stream into the northeast corner of the lake pond. This stream is down slope of several of the waste piles on site.

4.2.2 TOPOGRAPHY AND DRAINAGE

The Atlantic Asbestos site lies within the hill and valley area of northern Dutchess County. It is bordered on the east by the Taconic Mountains and on the west by the Hudson River. The hill and valley area ranges in elevation from about 400 - 500 feet above sea level on the hill tops and from about 200 - 300 feet above sea level in the valleys.

The site is located on a flat plain adjacent to Spring Lakes and partly on the geologic rise to the west of the lakes. The average elevation of the site is 275 feet above sea level. Behind the site to the northwest a hill rises to approximately 300 feet above sea level within one half mile. When surveyed by YEC, the lake and the small pond on the site were at elevations of 257.6 and 251.8 feet above mean sea level, respectively. These elevations can change throughout the dry and wet seasons.

Lakes Kill (also known as Saw Kill) lies adjacent to the site. It is bordered on both banks by a NYSDEC-designated wetland (CM-12). The Lakes Kill flows to the south, from Spring Lakes. As previously mentioned, a "closed-loop" surface water system incorporating an effluent pipe from the paper mill, several lagoons and the two ponds drains into the adjacent wetland through a culvert that runs beneath Dutchess County Route 55 (Spring Lakes Road). This happens only during periods of very high runoff.

4.2.3 SURFACE WATER USAGE

There are many fresh surface water bodies within a 3 mile radius of the site. All of them lie within the Hudson River watershed. The Spring Lakes (New York State Class B(T)) lie 1000 feet to the northeast. NYCRR Title 6, Section 701.19 states that waters of class B(T) are suitable for "primary contact recreation and any other uses except as a source of water supply drinking, culinary or food processing

purposes", and are also employed as trout spawning watercourses. The Lakes Kill (also Class B(T)) drains the Spring Lakes to the south. It is less than one quarter mile east of the site and is bordered on both banks by NYSDEC-designated wetlands CM-12. The small pond onsite drains into that wetland during periods of very high runoff. The Lakes Kill (also known as Saw Kill) flows south to drain into NYSDEC-designated wetland CM-26.

A water body not hydrologically related to the surface waters onsite or the nearby streams and lakes is an unnamed Class D tributary of Stoney Creek. It lies 2 1/2 miles to the west. Class D waters, according to NYCRR Title 6, Section 701.19, "are suitable for fishing", where "... water quality shall be suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose."

4.3 SITE HYDROGEOLOGY

In Dutchess County, groundwater occurs and is obtained from unconsolidated glacial deposits and from bedrock wells (Appendix A, Ref. 10). Water wells in the vicinity of Atlantic Asbestos are deeply sunk rock wells drilled into the Hudson River Formation (known also as the Normanskill Formation, Appendix A, Ref. 11). In the vicinity of Atlantic Asbestos, the Normanskill is composed of shales and sandstones. The shaly layers are highly fractured and thus easily transmit water. Hydraulic conductivities of 8.34 X 10⁻⁴ cm/s and 2.18 X 10⁻³ cm/s were assigned to GW-1 and GW-2, respectively, after the results of slug testing. These rather high values are common in wells screened in fractured rocks, such as GW-1, (Appendix A, Ref. 4 and 5) but the higher value found in GW-2 which was screened in clayey sand is attributable to its close proximity (<100 feet) to the lake and a stream flowing into the lake. GW-3, also screened in highly fractured rock, has an extremely high hydraulic conductivity. The water levels during slug testing of this well recovered so quickly that no data was available to compute the hydraulic conductivity, due to its close proximity to the lake and the highly fractured nature of the shale.

Groundwater flow at the site appears to be approximately .11 ft/ft to the westnorthwest, as indicated by static water levels in monitoring wells, topographic
observations in the field, and hydraulic gradient calculations. Hydraulic gradient
calculations are only approximate for three reasons; (1) two of the wells (GW-1 and
2) are rather closely placed, approximately 125 feet apart, (2) the distance from each
of these to the third well (GW-3) is over 700 feet, and (3) there are two rock wells in
fractured bedrock (GW-1 and GW-3) and one in overburden (GW-2). Groundwater
appears to be moving away from the high ground where GW-1 is located, toward a
geologic valley south of the Spring Lakes. Groundwater and surface water
accumulation may be connected in the vicinity of the small pond onsite. The water
levels taken at various positions around the small pond near the mill coincide with
static water levels taken in the nearest rock well, GW-3 (see Table 3-3). This is highly
speculative due to the fractured nature of the rock onsite.

Background information concerning the area surrounding the site indicates that there are ample domestic water supplies close to the surface and that rock wells are common. A rock well, located approximately 1/2 mile west of the site, at an altitude of 600 feet above sea level was drilled 75 feet bgs. The static water level in the well was 10 feet below ground surface, with a depth to bedrock of 2 feet below the ground surface. Average yields from wells in the Normanskill Formation are 16 gpm. Hydrogen sulfide is prevalent in the groundwater. Unconsolidated deposits overlying the Normanskill Formation typically contain high iron concentrations averaging 0.35 ppm with a range of 0.03 to 2.0 ppm (Appendix A, Ref. 10).

4.4 GEOLOGY/SOIL CHARACTERISTICS

The Atlantic Asbestos site is underlain by allochthonous Ordovician age clastic and argillaceous turbidites of the Normanskill Group. It consists of the 30 to 350 meter thick shales of the Indian River and Mount Merino Formations and the 300 meter thick Austin Glen Graywacke. Indian River formation shales are deep red with

lenses of green. Mount Merino shales tend to be green or black and contain chert. The Austin Glen has an upper and a lower phase, with the lower containing thin-bedded, clastic-bearing graywackes and clastics interbedded with argillite. The upper phase contains graywackes, siltstones, and limey argillaceous sandstones (Appendix A, Ref. 11).

Due to several orogenic episodes, these rocks became foliated, faulted, and metamorphosed. Locally, dip can vary from near horizontal to overturned. Strike is to the west-southwest. Quartz veins infiltrated along fault planes in these rocks. These veins transmit water readily and locally are the sought after water source for bedrock wells.

During the Pleistocene (Wisconsin Epoch), the Mid-Hudson Valley was covered by an ice sheet approximately 1 to 2 miles thick. Glacier movement was from northeast to southwest. Deposits of mixed unconsolidated materials (till) were laid down over much of Dutchess County. About 15,000 years ago, during the Recent Epoch, the climate began to warm and the glacier retreated intermittently leaving stratified drift deposits, till, and preglacial lake sediments. Fine and coarse-grained stratified drift was deposited in the stream valleys. Due to isostatic rebound, land began to rise. Streams resumed eroding bedrock and glacial debris, as they do today. Atlantic Asbestos is located in an area of thin Pleistocene till atop a geologic rise.

There are three regional soils present on site. The soil covering the low ground near the ponds is known as the Wayland silt loam (We) (Appendix A, Ref.12). It is a deep, nearly level, poorly drained, medium to high lime loamy soil formed in silty alluvium on the lowest parts of flood plains. It is low in permeability with poor drainage and low erodibility. The dominant slope ranges from 0% to 3%.

The Wayland soil typically has a high water table (0.0 - 0.5 ft.) at or near the soil surface from November to June. Flooding is common, especially in the spring and during periods of heavy runoff. Runoff is slow and ponding can occur. Erosion is not

extensive due in part to the typical low slope. Average depth to bedrock is 5 feet or greater (Appendix A, Ref. 12).

There are two soil types covering the higher portions of the site: The Rock outcrop-Nassau shaly silt loam, rolling, and the Dutchess gravelly silt loam. The former consists of 40% rock outcrop and 40% Nassau soils. The rock outcrop portion of this complex is exposed shale, or soil which is too thin to support plant life. The Nassau component of this complex is a shallow, hilly, somewhat excessively drained, low lime soil formed in till that is 10 to 20 inches thick over bedrock. The permeability is moderate and the dominant slope ranges from 15 to 30%. The landscape is a series of uneven hills with strongly sloping sides. Each component contains numerous outcrops.

The Nassau soil has a seasonal high water table of greater than 6 feet. Erosion is very high. The general permeability is from 0.6 to 2.0 inches per hour at a depth of 0 to 15 inches. The average depth to bedrock is 10 to 20 inches.

The Dutchess soil has a seasonal high water table of greater than 6 feet. Erosion is moderate. The permeability ranges on average from 0.6 to 2.0 inches per hour from 0 to 39 inches and from 0.6 to 20.0 inches per hour at from 39 - 52 inches. The average depth to bedrock is from 40 to 84 inches.

4.5 ANALYTICAL RESULTS

The following subsections present the data obtained from analytical tests performed on samples collected during this Phase II investigation. Only those values found to be above the detection limit are presented in the analytical summaries or discussed within the following text. A complete presentation of laboratory analyses and quality control can be found in Appendix F.

The following media were sampled to determine the extent of contamination both on and offsite:

- o Groundwater
- o Surface Water
- o Soil
- o Sludge
- o Sediment
- o Air

Summary tables for the analytical results for each of these media were composed only for those analyses (inorganics, pesticides/PCBs, semivolatiles, and volatile organics) in which contaminants were detected. Summary tables for asbestos analytical results were also included in this report.

4.5.1 PREVIOUS SAMPLING AND ANALYSIS

In response to a complaint by a nearby resident, four liters of plant effluent were collected on October 17, 1979 and sent to a laboratory to test for several physical and chemical parameters. The results of the tests indicated that the pH of the wastewater was slightly higher (7.9) than that of regional surface waters (Appendix A, Ref. 8). Total suspended solids (445 mg/l, very high as per Appendix A, Ref. 13), fixed suspended solids (450 mg/l, extremely high) and total dissolved solids (154 mg/l, low) were abundant. The BOD and COD of the wastewater was lower than other typical effluent (Appendix A, Ref. 8).

A test for asbestos fibers in water was performed on a sample of plant effluent on August 27, 1988 by Electron Microscopy Service Laboratories Inc. The fiber analysis was done by Transmission Electron Microscopy (TEM), Selective Area Electron Diffraction (SAED) and Energy Dispersive X-Ray Microanalysis (EDX) ---

EPA Level II. No asbestos was detected (Appendix A, Ref. 2).

On April 5 and 6, 1989, drinking water samples were collected from Atlantic Asbestos and two nearby private homes (Jenkins and Horkan). The New York State Department of Health analyzed each for inorganics, volatile halogenated organics, aromatic purgeables, and pesticides and PCB's. The results indicated that iron content exceeded the Federal Drinking Water Standards for the sample collected from the wash sink at the Atlantic Asbestos well (Appendix A, Ref. 2).

4.5.2 PHASE II AIR QUALITY DATA

Prior to initiating any field activities at Atlantic Asbestos, an initial screening of ambient air quality upwind and downwind of areas of interest was performed. A NYSDEC-supplied HNU photoionization detector equipped with a 10.7 eV bulb was used. No readings above ambient background were detected.

Air quality readings were performed during drilling and sampling activities utilizing a HNU photoionization detector and also a MIE PDM-3 Miniram dust, aerosol, and mist monitor. There were no constant above-background values in the breathing zone during any investigative procedures.

4.5.3 GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were collected from three monitoring wells (GW-1, GW-2, and GW-3). GW-1 was located upgradient from the large waste pile, while GW-2 was installed downgradient. GW-3 was placed adjacent to the settling lagoons. A fourth sample (taken from GW-3) was submitted to the laboratory as a blind (duplicate) for quality control. The samples were analyzed utilizing NYSDEC-CLP protocols for volatile organics, base/neutral and acid extractable organics,

pesticides/PCBs, and metals. The following discussion compares the NYSDEC Class GA (September 25, 1990) standards with the analytical results for the three monitoring wells sampled. Table 4-1 lists the wet lab results for the groundwater and surface water samples.

INORGANICS

Filtering of a groundwater sample that was taken for analysis of metals content was required by the NYSDEC if the turbidity of the unfiltered sample was greater than or equal to 100 NTU. Filtering is designed to remove suspended inorganics, so that elements detected in the filtered samples are known to be in solution. For GW-2, two samples were submitted for TCL Metal analysis. One of the samples was unfiltered (labeled GW-2), while the second sample was filtered and designated with an "F" (GW-2F). The filtering procedure utilized MSI 0.45 Micron Polypro Prefilters and a small vacuum pump.

It should be noted that there is a direct relationship between turbid water samples and high concentrations of inorganics in groundwater samples.

Table 4-2 shows the concentrations of inorganics in groundwater, including the contrasting data for the filtered and unfiltered samples of GW-2.

Many samples analyzed for TCL Metals exceeded the contract required detection limits (hereafter referred to as detection limit). In most cases, the unfiltered sample for GW-2 had far greater concentrations of inorganics than any other sample (see Table 4-2). The filtered sample of GW-2 compared well with results of other wells. Only the concentrations of iron ((GW-1, 2320 ug/L), (GW-2, unfiltered, 51700 ug/L), (GW-3, 1040 ug/L)) and manganese (GW-2, unfiltered, 1820 ug/L) violated the New York State Ambient Water Quality Standards (September 25, 1990) and Guidance Values.

Copper (76.3 ug/L) and lead (17.0 ug/L) were also found to be in excess of the detection limits in unfiltered GW-2 but did not exceed the New York State

TABLE 4-1
ATLANTIC ASBESTOS
WETLAB ANALYSIS OF GROUND AND SURFACE WATER SAMPLES

SAMPLE NO.	TOTAL DISSOLVED SOLIDS (mg/L)	TOTAL SUSPENDED SOLIDS (mg/L)	CHEMICAL OXYGEN DEMAND (mg/L)	рH	CONDUCTIVITY (umhos/cm)
GW-1	234	16	<5	7.35	401
GW-2	167	306	14	6.92	291
GW-3	170	62	11	6.95	292
GW-4	165	37	12	6.95	284
sw-1	191	4 + <.01%	11	7.17	331
SW-2	197	110 + <.01%	82	7.00	321

^{*} Analyses were performed in accordance with Methods for analysis of Water and Wastes, EPA 600/4/79-020, and Test Methods for Evaluating Solid waste, SW-846.

⁽a) - Water with a TDS between 0 and 1000 is considered fresh water.

^{(*) -} TDS shall not exceed 500 mg/L (NYSDEC Title 6, Chapter X, Part 701.19 for class AA drinking water).

^{(+) -} Modified Total Suspended Solids analysis for asbestos using a .45 micron filter and a detection limit of 1% or 10,000 ppm.

TABLE 4-2
ANALYTICAL SUMMARY OF INORGANIC ANALYSES OF GROUNDWATER SAMPLES
(UG/L)

NYSDEC(1) Parameter **GW-1** GW-2 GW-2F GW-3 GW-4 (ug/L) Aluminum 1120 E 20200 E 314 E 892 E 1000 E NS Antimony u U u U u 3 GV Arsenic UN UN UNW UN UN 25 Barium u Ü u U U 1000 Beryllium U U Ų U U 3 GV Cadmium U U U U Ü 10 Calcium 76800 53200 57700 33800 33800 NS Chromium Ü 23.6 U u п 50 U Cobalt U u Ù U NS Copper U 76.3 U Ü Ú 200 Iron 2320 51700 415 1040 1070 300 Lead 3.2 BN 17.0 N UNW 3.4 BN 3.0 BN 25 Magnes i um 4160 B 12100 5310 9150 9220 35000 GV Manganese 99.3 1820 15.7 50.5 38.6 300 Mercury U U U u 11 2 Nickel U U U u U NS Potassium U 4530 B u U U NS Selenium UNW UÑ UN UN UN 10 Silver u п U U U 50 Sodium 4510 B 4120 B 3870 B 10000 10200 20,000 Thallium U U UW UW ÚW 4 GV Vanadium U Ü U U u NS Zinc U 267 27.9 39.4 22.3 300 Cyanide U U NR Ú U 100

NOTE:

Assumed Hardness = 100, and Assumed pH = 7.5

U - Indicates analyte was analyzed for but not detected.

B - The reported value is less than the CRDL but greater than the Instrument Detection Limit.

E - The reported value is estimated because of the presence of interference.

N - Spiked sample recovery not within control limits.

W - Post-digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

⁽¹⁾ NYSDEC Groundwater Standards for class GA water.

Ambient Water Quality Standards and Guidance Values (6 NYCRR Parts 701-702-703.6)(September 25, 1990).

GV Guidance Value

⁽NS) No Standard Available.

NR - Analyte not required to be analyzed for.

F - Sample was filtered sample due to NTU > 100 following purging.

Groundwater Standards. Magnesium concentrations found in unfiltered GW-2 (12100 ug/L) and GW-3 (9150 ug/L) exceeded the detection limit, but did not exceed the groundwater guidance value set forth by the NYSDEC. Both unfiltered GW-2 (267 ug/L) and GW-3 (39.4 ug/L) had concentrations of zinc in excess of the detection limit, but in neither case do they exceed the NYSDEC standards for this element in groundwater. The spiked sample recoveries for arsenic, lead, and selenium were not within control limits for all of the samples. GW-2 had the highest concentrations of aluminum, chromium, copper, iron, lead, magnesium, manganese and zinc. GW-3 exhibited the highest concentration of sodium.

Even though iron and manganese were found to be in excess of the NYSDEC drinking water standards, they are not considered toxic heavy metals, and it is therefore concluded that there is no toxic heavy metal contamination in any of the three monitoring wells on this site.

SEMIVOLATILE ORGANICS

There were no reported concentrations of semivolatile organic compounds in excess of the detection limit for any of the groundwater samples. There was a tentatively identified compound detected in the sample from GW-1, 4-hydroxy-4-methyl 2-pentanone, also known as diacetone alcohol (Appendix A, Ref. 15). Its concentration was estimated to be 8 ug/L. This substance was also found in the associated blank. Its presence may be related to glassware cleaning procedures in the laboratory.

VOLATILE ORGANICS

The only reported concentration of a volatile organic compound found to be in excess of the detection limit was detected in GW-1. 2-butanone was found to have a concentration of 11 ug/L. This compound was also found in the associated blank. A tentatively identified compound, chlorodifluoromethane, was detected in all the monitoring well samples. The concentrations were estimated and found in the associated blanks. The estimated levels were: GW-1, 14 ug/L; GW-2, 24 ug/L; GW-3,

26 ug/L; trip blank, 9 ug/L; field blank, 21 ug/L. There are no NYSDEC criteria for these compounds. Chlorodifluoromethane is the common refrigerant, Freon 22, and is a low-temperature solvent (Appendix A, Ref. 15).

PESTICIDES/PCB'S

There were no reported concentrations of pesticides or PCB's found in any of the groundwater samples.

4.5.4 SURFACE WATER ANALYTICAL RESULTS

Two surface water samples (SW-1 and SW-2) were taken from the lake on the site and correspond to the two sediment samples (see Plate A) taken at the same locations. The samples were analyzed utilizing NYSDEC-CLP protocols for volatile organics, base/neutral and acid extractable organics, pesticides/PCB's, and metals.

INORGANICS

A turbid surface water sample taken for SW-2 produced inflated values of aluminum, iron, manganese, sodium and zinc (see Table 4-3). All of these elements, as well as calcium in both SW-1 and SW-2, were in excess of their respective detection limits. Of these reported concentrations, only aluminum (612 ug/L in SW-1, 1920 ug/l in SW-2) and iron (620 ug/L in SW-1, 3170 in SW-2) exceeded the NYSDEC Standards for a Class B waterbody for both samples. Zinc (50.1 ug/L) was found to be in violation of the NYSDEC standard for a class B waterbody in SW-2 only. Though the lake and the smaller pond have no state water body designations, a Class B designation was used since both can flow into other Class B water bodies such as the Lakes Kill. There are no NYSDEC criteria for a Class B waterbody for calcium, magnesium, manganese, and sodium. With the exception of zinc, none of these elements are considered toxic heavy metals.

TABLE 4-3
ANALYTICAL SUMMARY OF INORGANIC ANALYSES OF SURFACE WATER SAMPLES (ug/L)

Parameter	sw-1	sw-2	NYSDEC (1) STANDARDS (ug/L)
Aluminum	612 E	1920 E	100
Antimony	U	U	-
Arsenic	UN	UŅ	190 (2)
Barium	Ū	U	-
Beryllium	· U	U	11 or 1,100 (2)
Cadmium	Ù	Ŭ °	1.1 (3)
Calcium	57100	47500	•
Chromium	Ŭ	U	207 (4)
Cobalt	ប	U	5
Copper	Ŭ	Ü	11.8 (5)
Iron	620	3170	300
Lead	UNW	4.5 BN	3.2 (6)
Magnesium	5450	5840	-
Manganese	41.9	497	-
Mercury	Ŭ	Ū	.2 GV
Nickel	ប	บ	95.6 (7)
Potassium	Ŭ	U	- '
Selenium	UN	UN	1.0
Silver	σ	U	0.1 (8)
Sodium	4490 B	11500	-
Thallium	WU	UW	8
Vanadium	U	U	14
Zinc	U	50.1	30
Cyanide	U	U	5.2 (9)

U - Indicates analyte was analyzed for but not detected.

- $(3) \exp(.7852(\ln(ppm hardness)) 3.490)$
- $(4) \exp(0.819(\ln(ppm hardness))+1.561)$
- $(5) \exp(0.8545(\ln(ppm hardness))-1.465)$
- (6) $-\exp(1.266(\ln(ppm hardness))-4.661)$
- (7) exp(.76(ln(ppm hardness))+1.06)
- (8) Ionic silver
- (9) As free CN, the sum of HCN and CN expressed as CN.

N - Spiked sample recovery not within control limits.

W - Post-digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

E - The reported value is estimated because of the presence of interference.

B - The reported value is less than the CRDL but greater than the Instrument Detection Limit.

^{* -} Duplicate analysis not within control limits.

^{(-) -} No Standard available

^{(1) -} NYSDEC Ambient Water Quality Standards and Guidance Values(Parts 701-703). (For class B surface waters)

^{(2) - 11} ppm if Hardness is less than or equal to 75 ppm. 1,100 if Hardness is greater than 75 ppm.

SEMIVOLATILE ORGANICS

Sample SW-2 had a reported concentration of 15 ug/L for 2-methylnaphthalene which exceeded the detection limit. There is no NYSDEC criteria for this compound. It is associated with insecticides, organic synthesis and solvents. It may be derived from solvent use by the recycling plant. There were no other reported concentrations of semivolatile organic compounds in excess of detection limits. There were several unknown and tentatively identified compounds reported for both SW-1 and SW-2. SW-1 had a reported concentration of 9 ug/L of 4-hydroxy-4-methyl 2-pentanone (diacetone alcohol) which was estimated and found in the associated blank. SW-2 contained an estimated 13 ug/L of 1-methylnaphthalene, a coal tar derivative used in organic synthesis and insecticides (Appendix A, Ref. 15).

VOLATILE ORGANICS

There were no reported concentrations of volatile organic compounds in excess of detection limits for either of the surface water samples. A tentatively identified compound, chlorodifluoromethane (Freon 22), was detected in both surface water samples. The concentrations were estimated to be 23 ug/L for SW-1 and 14 ug/L for SW-2. This substance also found in the associated blanks.

PESTICIDES/PCB'S

There were no reported pesticide/PCB concentrations for either SW-1 or SW-2.

4.5.5 SEDIMENT ANALYTICAL RESULTS

INORGANICS

Two sediment samples (SD-1 and SD-2) were collected in association with the two surface water samples (SW-1 and SW-2). A summary of the inorganic analysis of the sediment samples is presented in Table 4-4. No NYSDEC criteria have been specifically set for sediment samples. Therefore, a comparison was made between

TABLE 4-4
ANALYTICAL SUMMARY OF INORGANIC ANALYSES OF SEDIMENT SAMPLES (mg/Kg)

Parameter	SD-1		SD-2	+Trace Element Concentration Expected in Soils(mg/Kg)
Aluminum	11900		23500	10,000-300,000
Antimony	UN		UN	· •
Arsenic	2.2	N*	12.1 SN*	1.0-40
Barium	53.7		70.5	100-3500
Beryllium	U		Ü	.1-40
Cadmium	1.2		3.5	.01-7
Calcium	1730		2130	100-400,000
Chromium	11.6	E	21.9 E	5.0-3,000
Cobalt	U		16	1.0-40
Copper	13.9	UE	34.8 E	2.0-100
Iron	14900		41900	7,000-550,000
Lead	19.3		34.3	2.0-200
Magnesium	3230		7070	600-6,000
Manganese	92.9	E	270 E	100-4000
Mercury	U		U	.0108
Nickel	23.6		44.4	5.0-1,000
Potassium	ט		ប	400-30,000
Selenium	UWN		UWN	.1-2.0
Silver	U		ŭ	.1-5.0
Sodium	U		ប	750-7500
Thallium	ซ		Ŭ	.1-12
Vanadium	15.8		25.3	20-500
Zinc	57.4	E	110. E	10-300
Cyanide	ט			-

^{+ &}quot;The Soil Chemistry of Hazardous Materials", James Dragun, Ph.D. Hazardous Materials Control Research Institute, Silver Spring, Maryland.

U - Indicates analyte was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. instrument for the specific analysis.

N - Spiked sample recovery not within control limits.

S - Reported value was determined by the Method of Standard Additions (MSA).

W - Post-digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

^{* -} Duplicate analysis not within control limits.

those elements with concentrations in excess of the detection limit and the typical range of concentrations for various elements in native soils (Appendix A, Ref. 14). Several inorganic elements were found to be above the detection limit, but only magnesium (SD-2) was outside the typical range of 600 to 6000 mg/Kg, with a concentration of 7070 mg/Kg. The spiked sample recovery for antimony, arsenic, and selenium was not within control limits for either sample. Because of interference, the concentrations of chromium, copper, manganese, and zinc were estimated for both of the samples. While magnesium was found to be outside the typical range for this element in native soils, it is not considered a toxic heavy metal and therefore it is concluded that there is no contamination of toxic heavy metals in either of these samples.

SEMIVOLATILE ORGANICS

There were no reported concentrations of semivolatile organic compounds in excess of the detection limits. There were, however, several unknown and tentatively identified compounds reported for both samples. The following compounds were tentatively identified: 4-hydroxy-4-methyl 2-pentanone (diacetone alcohol), benzaldehyde, and hexadecanoic acid. All of the concentrations for these compounds were estimated and several were found in the associated blank for each sample. Diacetone alcohol has been found in all samples, including blanks. Benzaldehyde is used in dye manufacturing, solvents, resin, cellulose ethers, benzoic acid and many other applications. Hexadecanoic acid is used in solvents. These compounds and their respective concentrations are listed in Table 4-5.

VOLATILE ORGANICS

There were no reported volatile organic compounds in excess of the detection limits for either sample. The only tentatively identified compound noted was 2-methylpropane, which was found in SD-1 with an estimated concentration of 29 ug/L. See Table 4-5 for the analytical results.

TABLE 4-5 SUMMARY TABLE OF SEMIVOLATILE ORGANIC ANALYSES OF SEDIMENT SAMPLES (mg/Kg)

* TENTATIVELY IDENTIFIED COMPOUNDS	SD-1	SD-2
UNKNOWN	440 JB	610 JB
UNKNOWN	1700 JB	2800 JB
UNKNOWN	900 JB	1000 JB
UNKNOWN	490 JB	700 JB
UNKNOWN	420 J	980 J
UNKNOWN	540 J	750 J
UNKNOWN	300 J	1600 J
UNKNOWN	310 J	530 J
UNKNOWN	950 J	420 J
	590 J	3300 J
UNKNOWN	3,0 0	690 J
UNKNOWN	_	420 J
UNKNOWN	_	670 J
UNKNOWN	_	680 J
UNKNOWN	_	3200 J
UNKNOWN	5700 TP3	8500 JBA
2-PENTANONE, 4-HYDROXY-4-MET (+)	5700 JBA	2100 JB
BENZALDEHYDE	2000 JB	2400 JB
HEXADECANOIC ACID	1200 JB	
UNKNOWN ALIPHATIC HYDROCARBON	930 J	2300 J
UNKNOWN ALIPHATIC HYDROCARBON	2000 J	2000 J
UNKNOWN ALIPHATIC HYDROCARBON	490 J	-

J - Indicates an estimated value.

B - The analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.

A - This flag indicates that a TIC is a suspected aldol-condensation product. (TIC - Tentatively Identified Compound)

^{(+) - 4-}HYDROXY-4-METHYL 2-PENTANONE

PESTICIDE/PCB'S

Neither sample had concentrations of pesticide/PCB's in excess of the contract quantitation limits.

4.5.6 SOIL ANALYTICAL RESULTS

INORGANICS

Four soil samples (SS-1, SS-2, SS-3, and SS-4) were collected and analyzed for 24 TCL Metals. A summary of the inorganic analysis of the soil samples is presented in Table 4-6. There are no specific NYSDEC criteria set for soils. Therefore, a comparison was made between those elements with concentrations in excess of the detection limit and the typical range of concentrations for various elements in native soils (Appendix A, Ref. 14).

10 TCL Metals analyzed for were found to be above the detection limit in one or more of the samples. All were found to be within the normal range of concentrations expected in soils except for magnesium (SS-2), which was reported as having a concentration of 6300 mg/Kg. The normal range for magnesium in soil is from 600 to 6000 mg/Kg. Magnesium, however is not considered a toxic heavy metal.

SEMIVOLATILE ORGANICS

There were no semivolatile compounds reported in excess of the detection limits for any of the samples. There were however, several unknown and tentatively identified compounds reported for some or all four samples. They are 4-hydroxy-4-methyl 2-pentanone and hexadecanoic acid. These compounds were found in the associated blank for each sample. Estimated concentrations in soil for 4-hydroxy-4-methyl 2-pentanone ranged from 3000 to 4500 mg/kg. For hexadecanoic acid, concentrations ranged from 350 to 470 mg/kg. An estimated 910 mg/kg of benzaldehyde was discovered in SS-1. All may have been detected due to their usage in laboratory work, although benzaldehyde is used in dye manufacture and may be a

TABLE 4-6
Tentatively Identified Volatile Organic Compounds and PCBs

Sample	Volatile Organic Compound (ug/Kg)	Pesticide/PCB's (ug/Kg)
SD-2	Chloroform/7J 2-Methylpropane/29BJ	- -
SS-1	2-Methylpropane/11BJ	Ξ.
SS-4 SL-2	2-Methylpropane/80BJ -	Aroclor-1254/930Y

J - Indicates an estimated value.

B - The analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. instrument for the specific analysis.

Y - The reported Pesticide/PCB result is below the reported contract required quantitation limit.

TABLE 4-7
ANALYTICAL SUMMARY OF INORGANIC ANALYSES OF SOIL SAMPLES (mg/Kg)

Parameter	\$\$-1	ss-2	\$ \$-3	\$\$-4	\$\$-1\$/F\$	SS-1D	*Trace Element Concentration Expected in Soils(mg/Kg)
Aluminum	15200	17300	16500	15200	NR	15400	10,000-300,000
Antimony	UN	UWN	UWN	UN	UN	ÚN	.6-10
Arsenic	5.5 SN*	8.9 SN*	7.7 SN*	8.2 SN*	8.9 N*	3.6 SN*	1.0-40
Barium	62.2	37.9	U	48.5	262	61.1	100-3500
Beryllium	ΰ	U	U	U	5.8	U	.1-40
Cadmium	3	3.4	3.6	2.8	8.4	2.4	.01-7
Calcium	1460	978	689	895	NR	1490	100-400,000
Chromium	12.7 È	14.4 E	14.3 E	16.1 E	32.2 E	13.7 E	5.0-3,000
Cobalt	9.2 B	15.6	9.9	9.3	63.2	9.3	1.0-40
Copper	20.7 E	21.2 E	33.7 E	23.1 E	47.6 E	22.5 E	2.0-100
Iron	25500	38300	38400	28300	NR NR	24600	
Lead	17.3	34.6	24	96	26.4	18.7	7,000-550,000 2.0-200
Magnes i um	3920	6300	5980	5190	NR	3980	
Manganese	903 E	964 E	178 E	466 E	1080 E	771 E	600-6,000
Mercury	Ú	U.	U	U	0.52	//1 E.	100-4000
Nickel	18.9	24.9	30.7	28.5	76.5	24.3	.0108
Potassium	893 B	U	513 B	U	NR	<i>2</i> 4.3 941	5.0-1,000
Selenium	UWN	ÜN	ÚN	LILIN	UN		400-30,000
Silver	Ü	u.	U	U	8.9	UWN	.1-2.0
Sociium	Ū	Ü	Ü	Ü	NR	Ü	.1-5.0
Thallium	Ü	ŭ	Ù	U	8.2	Ŭ	750-7500
Vanadium	18.8	19.1	15.4	18	9.2 67.8	U	.1-12
Zinc	73.5 €	74.0 E	94.6 E	80.5 E		20.1	20-500
Cyanide	U	U	U U	U	120 E 6.1	74.5 E Ü	10-300

[&]quot;The Soil Chemistry of <u>Hazardous Materials</u>", James Dragun, Ph.D. Hazardous Materials Control Research Institute, Silver Spring, Maryland.

U - Indicates analyte was analyzed for but not detected.

B - The reported value is less than the CRDL but greater than the Instrument Detection Limit.

E - The reported value is estimated because of the presence of interference.

N - Spiked sample recovery not within control limits.

S - Reported value was determined by the Method of Standard Additions (MSA).

W - Post-digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

^{* -} Duplicate analysis not within control limits.

NR - Analyte not required to be analyzed for.

TABLE 4-8
SUMMARY TABLE OF SEMIVOLATILE ORGANIC ANALYSES OF SOIL SAMPLES
(mg/Kg)

TENTATIVELY IDENTIFIED COMPOUNDS	\$\$-1	SS-2	ss-3	SS-4
UNKNOWN	1100 JB	950 JB	710 JB	1000 JB
UNKNOUN	580 JB	520 JB	410 JB	570 JB
UNKNOWN	360 JB	850 J	1200 J	330 18
UNKNOWN	•	680 J	520 J	780 J
UNKNOWN	•	1200 J	390 J	560 J
UNKNOWN	A	•	•	340 J
UNKNOWN	•	-	•	590 J
UNKNOWN	•	•		700 J
UNKNOWN	•	•	• ,	610 J
UNKNOWN	•	•	• '	350 J
UNKNOWN	•	•	•	610 J
UNKNOWN	•	•	•	3000 J
UNKNOWN	•	•	•	380 J
UNKNOWN ALIPHATIC HYDROCARBON	570 JB	1700 J	370 J	1400 J
UNKNOWN ALIPHATIC HYDROCARBON	1300 JB	2500 J	•	2400 J
UNKNOWN ALIPHATIC HYDROCARBON	450 JB	590 J	• ;	•
HEXADECANOIC ACID	470 JB	350 JB	•	•
BENZALDEHYDE	910 JB	-	• .	•
2-PENTANONE, 4-HYDROXY-4-MET	4100 JBA	4500 JBA	3000 JBA	4500 JBA
UNKNOUN ALDEHYDE	•	370 J	-	•
Pyrene	•	80 J	• ,	•

⁽¹⁾ cannot be seperated from Diphenylamine

U - Indicates compound was analyzed for but not detected.

J - Indicates an estimated value.

B - The analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.

A - This flag indicates that a TLC is a suspected aldol-condensation product. (85-115%), while sample absorbance is less than 50% of spike absorbance.

result of the paper recycling process (Appendix A, Ref. 15).

VOLATILE ORGANICS

No volatile organic compounds were found to be in excess of the detection limits in any of the above-mentioned samples. Two compounds found in SS-4 (methylene chloride, estimated 4 ug/L and 2-methylpropane, estimated 80 ug/L) were also found in the associated blank. One compound, 2-methylpropane, (estimated 11 ug/L) was found in sample SS-1 and in its associated blank.

PESTICIDE/PCB'S

There were no reported pesticide/PCB concentrations in excess of the contract quantitation limits for any of the soil samples.

4.5.7 SLUDGE ANALYTICAL RESULTS

<u>INORGANICS</u>

Four settling lagoon sludge samples, SL-1, SL-2, SL-3 and SL-4 (from dredged material), were collected and analyzed for 24 TCL Metals. The following elements were reported to be above their respective detection limits for samples SL-1 through SL-4: aluminum; iron; lead; magnesium (all but SL-1); nickel (all but SL-1); chromium and copper (estimated concentrations); and cyanide. SL-3 had the highest concentrations of aluminum (14,300 mg/Kg), iron (27,600 mg/Kg), lead (97.8 mg/Kg), magnesium (74,600 mg/Kg), nickel (677 mg/Kg), chromium (269 mg/kg), copper (114 mg/kg) and cyanide (15.5 mg/Kg). A summary of the inorganic analysis of the sludge samples is presented in Table 4-9.

There are no NYSDEC criteria for sludge, therefore inorganic analytical results are compared to data compiled from E.P.A. documents (Appendix A, Ref. 16). In the cases of aluminum, chromium, copper and cyanide, no comparable sludge data was available. Iron concentrations in SL-3 (27,600 mg/kg) and (SL-4 13,400 mg/kg) were greater than the mean municipal wastewater sludge concentration of 13,000 mg/kg.

TABLE 4-9
SUMMARY OF INORGANIC ANALYSIS OF SLUDGE SAMPLES
ATLANTIC ASBESTOS
(mg/Kg)

Parameter	SL-1	SL-2	SL-3	SL-4
Aluminum	4180	1710	14300	7040
Antimony	76.0 U N	50.9 U N	102 U N	54.1 U N
Arsenic	9.8 U WN	7.0 U WN*	16.2 U N*	8.2 U N*
Barium	U	บ	U	U
Beryllium	Ù	U	บ	U
Cadmium	U	U	U	U
Calcium	U ·	U ,	U	U :
Chromium	25.9 E	34.8 E	269 E	159 E
Cobalt	U	U	Ü	U
Соррег	90.7 E	88.7 E	114 E	85.6 E
Iron	5530	2150	27600	13400
Lead	29.3	22.1	97.8	57.3
Magnes i um	3890 B	6730	74600	39200
Manganese	71.5 E	63.2 E	465 E	457 E
Mercury	U	U	Ü	1.4
Nickel	U	50	677	309
Potassium	U	U	U	U
Selenium	49 UN	3.5 U WM	8.1 U WN	41 U N
Silver	U	U	U	U
Sodium	U	U	V	U
Thallium	Ü	บ	U	U
Vanadium	Ū →	U	U	U
Zinc	162 E	119	380 E	201 E
Cyanide	11.1	6.5	15.5	10.8

U - Indicates analyte was analyzed for but not detected.

B - The reported value is less than the CRDL but greater than the Instrument Detection Limit.

E - The reported value is estimated because of the presence of interference.

N - Spiked sample recovery not within control limits.

W - Post-digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

^{* -} Duplicate analysis not within control limits.

The concentrations of manganese in SL-3 (465 mg/kg) and SL-4 (457 mg/kg) were greater than the mean of 380 mg/kg. The concentrations of nickel in SL-3 (677 mg/kg) were higher and slightly lower in SL-4 (309 mg/kg) than the mean of 380 mg/kg. Magnesium content in all except SL-1 were considerably higher than the mean value (5,000 mg/kg) in municipal sludge, ranging from 6,730 mg/kg to 74,600 mg/kg. Lead and copper content in site samples was considerably lower than that for municipal samples. The spike recovery for antimony, arsenic and selenium was not within control limits for all of the samples. Due to interference, concentrations of chromium, copper, manganese and zinc were estimated for all of the sludge samples. With the exception of nickel, lead and cyanide, none of the above substances in high concentrations are considered toxic heavy metals. Chromium is not considered toxic here because the analysis was for total chromium, not hexavalent.

SEMIVOLATILE ORGANICS

All of the four sludge samples so analyzed exhibited concentrations of 2methylnaphthalene above the detection limits. Concentrations ranged from 140,000 ug/kg in SL-1 to 13,000 ug/kg in SL-3. Naphthalene was also reported in all samples, ranging from 20,000 ug/kg in SL-1 to 1400 ug/kg in SL-4. Due to the presence of interference, the concentrations of naphthalene for all four samples was estimated. The concentrations of bis(2-ethylhexyl)phthalate were estimated in samples SL-1 (8,700 ug/kg), SL-2 (3,400 ug/kg) and SL-3 (4,100 ug/kg). There was no reported concentration of this compound for SL-4. There were several unknown and tentatively identified compounds detected for all of the samples. Among those reported are: 1-methylnaphthalene, (SL-1 (85,000 ug/Kg), SL-2 (18,000 ug/Kg), hexadecane. (SL-1 having the highest concentration at 67,000 heptadecane, (SL-1 having the highest concentration at 82,000 ug/Kg), and octadecane, (SL-1 having the highest concentration at 63,000 ug/Kg).

All of the concentrations for the unknown and tentatively identified compounds were estimated due to the presence of interference. Their presence in the sludge may be due to their use in solvents or lubricants used at the mill. A summary of the

TABLE 4-10
SUMMARY OF SEMI-VOLATILE ANALYSIS OF SLUDGE SAMPLES
ATLANTIC ASBESTOS
(ug/kg)

COMPOUND	SL-1	SL-2	SL·3	SL-4
Phenol	U	U	U	U
bis (2-Chloroethyl) ether	U	U	U	U
2-Chlorophenol	U	U	U	U
1,3-Dichlorobenzene	ť	Ű	U	Ų
1.4-Dichlorobenzene	U	U	U	U
Benzyl alcohol	U	U	U	· U
1,2-Dichlorobenzene	บ	U ,	U	U
2-Methylphenol	บ	U	U	U
bis (2-Chloroisopropyl) ether	U	U	U	U
4-Methylphenol	U	U	U	Ü
N-Nitroso-di-n-propylamine	U	U	U	u
Hexachloroethane	U	U	U	U
Nitrobenzene	U	U	U	U
Isophorone	Ü	U	U	U
2-Nitrophenol	U	U	U	U
2,4-Dimethylphenol	Ü	U	U	U
Benzoic acid	Ü	U	U	u
bis (2-Chloroethoxy) methane	Ū	บ	U	U
2,4-Dichlorophenol	ŭ	U	U	U
1,2,4-Trichtorobenzene	บ	U	U	U
Naphthalene	20000 J	3900 J	2000 J	1400
4-Chloroaniline	U	U	U	' U
Hexachlorobutadiene	ŭ	Ü	U	. U
4-Chloro-3-methylphenol	ŭ	ยั	Ú	U
	140000	27000	13000	49000
2-Methylnaphthalene Hexachlorocyclopentadiene	U	Ü	U	· U
2,4,6-Trichlorophenol	ŭ	ŭ	U	U
	ũ	ŭ	Ú	u
2,4,5-Trichlorophenol	ŭ	ŭ	Ũ	U
2-Chloronaphthalene	Ü	ŭ	ŭ	Ū
2-Nitroaniline	ŭ	Ŭ	Ü	Ū
Dimethylphthalate	ŭ	ŭ	ŭ	ŭ
Acenaohthalate	Ü	ŭ	ű	ŭ
2,6-Dinitrotoluene	Ü	ŭ	Ü	ŭ
3-Witrosniline	Ü	ŭ	ŭ	ŭ
Acenaphthene	Ü	ŭ	ŭ	ŭ
2,4-Dinitrophenol	-	ŭ	ŭ	Ū
4-Nitrophenol	U	ŭ	ŭ	Ü
Dibenzofuran	_	-	ŭ	ŭ
2,4-Dinitrotoluene	Ü	U	Ü	Ü
Diethylphthalate	Ü	U	ŭ	Ü
4-Chlorophenyl-phenylether	Ü	Ü	-	Ü
fluorene	Ų	Ü	U	Ü
4-Nitroaniline	U	Ü	U	U
4,6-Dinitro-2-methylphenol	U	U	Ŋ	_
N-Nitrosodiphenylamine (1)	U	U	U	Ü
4-Bromophenyl-phenylether	U	U	Ü	U
Hexach Lorobenzene	U	Ü	Ü	Ü
Pentach Loropheno L	U	U	U	U

CONTINUED ON NEXT PAGE...

TABLE 4-10 CON'T

COMPOUND	SL-1	SL-2	SL-3	SL-3
Phenanthrene	U	U	U	U
Anthracene	U	U	U	U
Di-n-butylphthalate	U	U	U	Ŭ
Fluoranthene	U	U	u	U
Pyrene	U	IJ	U	U
Butylbenzylphthalate	U	U	U	U
3,3'-Dichlorobenzidine	Ü	U	U	U
Benzo(a) anthracene	U	U	บ	U
Chrysene	U	U	U	U
bis(2-Ethylhexyl)phthalate	8700 J	3400 J	4100 J	U
Di-n-octylphthalate	U	U	U	Ų
Benzo (b) fluoranthene	Ü	U	U	U
Benzo (k) fluoranthene	Ü	U	U	U
Benzo (a) pyrene	U	U	U.	U
Indeno (1,2,3-cd) pyrene	U	U	Ų	U
Dibenz (a,h) anthracene	U	U	U	U
Benzo (g,h,i) perylene	U	U	U	U
* TENTATIVELY IDENTIFIED COMPOUNT	NDS			
Unknown Aliphatic Hydrocarbon	60000	J 24000 J	33000 J	37000 J
Unknown Aliphatic Hydrocarbon	58000	J 19000 J	37000 J	69000 J
1-Methylnaphthalene	85000	J 18000 J		•
Unknown Dimethynaphthalene	70000	J -	•	41000 J
Hexadecane	67000	J 29000 J	46000 J	44000 J
Heptadecane	82000	J 32000 J	42000 J	43000 J
Octadecane	63000	J 25000 J	38000 J	40000 J
Unknown Aliphatic Hydrocarbon	52000	J 18000 J	53000 J	69000 J
Unknown	160000	J 17000 J	40000 J	•
Unknown Aliphatic Hydrocarbon	64000	J 51000 J	69000 J	45000 J
Unknown	71000	J 19000 J	44000 J	•
Unknown Aliphatic Hydrocarbon	53000	J 22000 J	52000 J	50000 J
Unknown	79000	J 33000 J	35000 J	•
Unknown Aliphatic Hydrocarbon	57000	J -	81000 J	50000 J
Unknown Aliphatic Hydrocarbon	73000	J -	51000 J	59000 J
Unknown Aliphatic Hydrocarbon	84000	j -	120000 J	48000 J
Unknown Polycyclic Hydrocarbon	84000	J 39000 J	62000 J	49000 J
Unknown Polycyclic Hydrocarbon	87000	J 41000 J	73000 J	60000 J
Unknown Aliphatic Hydrocarbon	53000	J -	38000 J	44000 J
Unknown	130000	J 56000 J	100000 J	•
Unknown	•	18000 J	-	-
Unknown		27000 J	-	•
Unknown Dimethoxy C-10 Aroma	•	160000 J		38000 J
Unknown Diethylbiphenyl	•	150000	-	38000 J
Unknown C-4 Alkylphenenthren	•	18000		•
Unknown Aliphatic Hydrocarbon		•	54000 J	43000 J
Unknown Aliphatic Hydrocarbon	•	•	35000 J	38000 1
Unknown Aliphatic Hydrocarbon	•	•	•	56000 J

U - Indicates compound was analyzed for but not detected. J - Indicates an estimated value.

TABLE 4-11 ATLANTIC ASBESTOS SUMMARY OF VOLATILE ORGANIC ANALYSIS OF SLUDGE SAMPLES (ug/Kg)

Compound	SL-1	SL-2	SL-3	SL-4
Chloromethane	บ	U	U	U
Bromomethane	U	U	Ŭ	บ
Vinyl Chloride	U	U	บ	ប
Chloroethane	U	U	U	U
Methylene Chloride	57 BJ	18 BJ	120 BJ	U ,
Acetone	U	7 J	Ü	U
Carbon Disulfide	U	U	U	U
1,1-Dichloroethene	Ŭ	บ	บ	U
1,1-Dichloroethane	U	U	บ	U
1,2-Dichloroethene (Total)	U	บ	U	U
Chloroform	Ū	31	ប	บ
1,2-Dichloroethane	Ū	บ	ប	บ
2-Butanone	ប	U	บ	ָּט
1,1,1-Trichloroethane	U ·	บ	U	U
Carbon Tetrachloride	Ü	U	U	U
Vinyl Acetate	ប	บ	ប	ប
Bromodichloromethane	บ	ซ	ប	U
1,2-Dichloropropane	บ	ช	U	U
cis-1,3-Dichloropropene	U	U	บ	บ
Trichloroethene	บ	ซ	U	Ü
Dibromochloromethane	Ü	ט	บ	U
1,1,2-Trichloroethane	Ü	U	ซ	U
Benzene	Ü	U	บ	บ
trans-1,3-Dichloropropene	Ü	U	Ü	บ
Bromoform	Ü	U	Ŭ	U
4-Methyl-2-Pentanone	Ü	U	ซ	Ŭ
2-Hexanone	Ū	Ū	U	ប
Tetrachloroethene	Ū	บ	U	U
1,1,2,2-Tetrachloroethane	Ū	Ū	U	U
Toluene	6100	Ü	5000	U
Chlorobenzene	U	Ü	U	U
Ethylbenzene	บ	บ	Ü	U
-	ŭ	Ü	ซ	U
Styrene	190	ŭ	Ū	U
Xylene (total)	200	•	-	-
* TENTATIVELY IDENTIFIED COMP				_
Unknown Hydrocarbon	230 J	_	-	_
Decahydronaphthalene	200 J	-	-	- 06 BT
2-Methylpropane	280 BJ	39 BJ	600 BJ	86 BJ
Unknown	-	-	-	78 J

U - Indicates compound was analyzed for but not detected.

J - Indicates an estimated value.

B - The analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.

semivolatile organic analysis of sludge is presented in Table 4-10.

VOLATILE ORGANICS

The following compounds were reported as being above the contract quantitation limits for volatile organic compounds: toluene, SL-1 (6100 ug/Kg), SL-3 (5000 ug/Kg), xylene (total), SL-1 (190 ug/Kg), and chloroform, SL-2 (31 ug/Kg). Methylene chloride was found in the associated blank of samples SL-1 through 3. The concentration was estimated due to the presence of interference. Acetone was detected in SL-2 but may be the result of laboratory contamination. The concentration was estimated. There were several unknown and tentatively identified compounds detected. 2-methylpropane was detected in the associated blank {SL-1, 280 ug/Kg, SL-2, 39 ug/Kg, SL-3, 600 ug/Kg, SL-4, 86 ug/Kg} for each of the samples. The concentration was estimated due to interference. Decahydronaphthalene was tentatively identified in SL-1 (200 ug/Kg). The concentration was estimated. A summary of the organic analysis of sludge is presented in Tables 4-6 and 4-11.

PESTICIDES/PCB

There were no reported concentrations of Pesticides or PCB's that exceeded the contract detection limits. Chromatographic peaks characteristic of Arochlors 1248, 1254, and 1260 were detected in the extract of SL-2. The PCB concentration was quantified as Arochlor 1254 as the laboratory determined that this most accurately reflected the concentration found in the sample. The reported concentration was found to be below the adjusted contract reporting limit. See Table 4-6 for details.

4.6 <u>ASBESTOS ANALYTICAL RESULTS</u>

The following subsections present the data obtained from analytical tests performed on air, sediment, sludge, and surface water samples for the presence of asbestos fibers. A map displaying chrysotile asbestos concentrations is found in Figure 4-1. The analytical data is presented in Table 4-11. A complete presentation

of laboratory analyses and quality control can be found in Appendix I.

4.6.1 ASBESTOS IN AIR

Three air samples were collected for asbestos analysis. Air sample 1 was collected from an area adjacent and downwind of the exposed settling lagoon dredge pile #4. Sample A-2 was taken downwind of the exposed dredge pile adjacent to settling lagoon #3. The upwind sample was taken upgrade from settling lagoon #5. The analysis was performed using the Phase Contrast Microscopy method of fiber counting. Only results greater than 5.5 fibers per 100 fields are reported (See Appendix I for detailed discussion of analytical methods). There were no positive reported results for any of the air samples. It should be noted, however, that the sludge piles were frozen at the time of the sampling. This would effect the final results of the analysis. Any asbestos fibers that may have been in the sludge piles at that time would not have been airborne while the piles were frozen.

4.6.2 ASBESTOS IN SEDIMENT AND SLUDGE

Two sediment samples were tested for asbestos. SD-1 and SD-2 were both taken from the large pond on site and correspond to the two surface water sampling points (see Figure 4-1 and Plate A). Analysis was performed by Polarized Light Microscopy and only results greater than 1% are reported (See Appendix I for detailed discussion of analytical methods). There were no reported results for either of the two sediment samples.

A total of seven sludge samples were analyzed for asbestos using the same analytical method employed in the sediment analysis. Four of the seven samples were reported as positive for asbestos (greater than 1%). A qualitative differentiation (between asbestos types and other fibers) was also determined for each of the samples

TABLE 4-12 SUMMARY TABLE FOR SEDIMENT AND SLUDGE ASBESTOS ANALYSIS (%)

	% SOLIDS	*RESULTS	
SLUDGE #1	24	No Asbestos detected	
SLUDGE #2	48	Positive for Asbestos (67% Chrysotile)	
SLUDGE #3 SLUDGE #4	30 62	No Asbestos detected No Asbestos detected	
SLUDGE #5	50	Positive for Asbestos (31% Chrysotile) (<1% Amosite) (<1% Crocidolite)	
SLUDGE #6	33	Positive for Asbestos (22% Chrysotile)	
SLUDGE #7	49	Positive for Asbestos (44% Chrysotile) (3% Amosite)	
SEDIMENT #1 75 SEDIMENT #2 80		No Asbestos detected No Asbestos detected	

^{* -} Analysis was performed using Polarized Light Microscopy (PLM).
"No asbestos Detected" means that <1% fibers were detected.

that were in excess of the reporting limit. SL-2, which was removed from the settling lagoon about 140 feet downstream from the plant discharge pipe, was reported positive for Chrysotile (67%). SL-5 was taken along the peninsula from settling lagoon #4 and was reported positive for Chrysotile (31%), Amosite (<1%), and Crocidolite (<1%). Sludge sample 6 was reported positive for Chrysotile (22%). It was removed from the stream bed about 200 feet from the mouth of the lagoon. SL-7, which was taken in the stream along the peninsula about 40 feet from the mouth of the lagoon, was positive for Chrysotile (44%) and Amosite (3%). See Table 4-12 for details.

4.6.3 ASBESTOS IN SURFACE WATER

An asbestos determination was performed on surface water samples SW-1 and SW-2 using a modified total suspended solids procedure. This test measures both the asbestos and non asbestos residue retained on a 0.45 micron filter. The reporting limit for this analysis is <0.01% (100 mg/L). There were no reported results for either of the surface water samples. See Table 3-5 for details.

4.7 CONCLUSIONS AND RECOMMENDATIONS

4.7.1 CONCLUSIONS

The conclusions of the Atlantic Asbestos Site Phase II investigation are as follows:

GROUNDWATER

The groundwater underlying the site has levels of iron and manganese that exceed the NYSDOH and NYSDEC Ambient Water Quality Standards, but this is primarily due to the turbidity of the sample GW-2. While iron and manganese are not toxic heavy metals it should be noted that upon oxidation both will precipitate which could cause undesirable tastes, turbidity, staining of plumbing fixtures, and deposits

on food. Chromium and aluminum content in unfiltered GW-2 exceed typical values found in groundwater. If the unfiltered sample for GW-2 is discounted and the filtered sample is compared to groundwater standards, only the iron content in any of the samples is in contravention of drinking water standards. It is concluded that in view of the above, there is no contamination of toxic heavy metals in the groundwater sampled.

A tentatively identified volatile organic compound, chlorodifluoromethane (Freon 22), was detected in all ground water samples. The estimated levels were: GW-1, 14 ug/L; GW-2, 24 ug/L; GW-3, 26 ug/L. The trip blank and field blank contained similar concentrations. There are no NYSDEC criteria for these compounds. Chlorodifluoromethane is the common refrigerant, Freon 22, and is a low-temperature solvent (Appendix A, Ref. 15). It may be considered an atmospheric or laboratory-derived contaminant.

There were no pesticide or PCB compounds found in samples of groundwater.

SURFACE WATER AND SEDIMENT

Two surface water and two sediment samples were taken from the lake on the site. SW-1 and SD-1 were collected from the edge of the pond about 240 feet downstream from the mouth of the lagoon. SW-2 and SD-2 were taken from the pond about 115 feet downstream from the lagoon mouth.

Both pairs of samples had concentrations of several TCL Metals that were reported in excess of the detection limits. The paired samples SW-2 and SD-2 had the higher concentrations of aluminum, iron, magnesium, manganese, and zinc than those for SW-1 and SD-1. SD-2 had higher concentrations of aluminum, iron, magnesium and zinc than SW-2. An examination of the total suspended solids in SW-2 reveals a much more turbid sample than that of SW-1 (110 mg/L vs. 4 mg/L). The level of manganese in SW-2 exceeded the concentration of that found in the sediment. The concentrations of aluminum and iron exceeded the NYSDEC standards for a class B

waterbody in both surface water samples. The zinc content in SW-2 exceeded the NYSDEC standard for a class B surface water.

There is no NYSDEC criteria for sediment, therefore a comparison was made between those elements found in the sediment and the typical range of values for these elements found in native soils (Appendix A, Ref.14). Only magnesium (SD-2) was found to exceed the upper limit of this range. Although there were violations of the NYSDEC standards, those elements (with the exception of zinc) are not considered toxic heavy metals. The level of zinc found in SW-2 exceeds the standard by a factor of 1.67 and is not considered a problem at this concentration. It is concluded therefore that there is no contamination of toxic heavy metals in the surface water or sediment samples.

Sample SW-2 had a reported concentration of 15 ug/L for 2-methylnaphthalene. Its presence may be due in part to its use as an insecticide or as a result of the use of solvents in the paper recycling plant. There were several unknown and tentatively identified compounds reported for both SW-1 and SW-2. SW-1 had a reported concentration of 9 ug/L of 4-hydroxy-4-methyl 2-pentanone (diacetone alcohol), which was estimated and found in the associated blank. Its presence may be related to glassware cleaning procedures in the laboratory. SW-2 contained an estimated 13 ug/L of 1-methylnaphthalene, occurring in association with the 2-methylnaphthalene. Both are coal tar derivatives (Appendix A, Ref. 15).

A tentatively identified semi-volatile compound, chlorodifluoromethane (Freon 22), was detected in both surface water samples. The concentrations were estimated to be 23 ug/L for SW-1 and 14 ug/L for SW-2. This substance also found in the associated blanks. This substance is so commonly found that it may be considered an atmospheric or laboratory-derived contaminant.

An analysis for asbestos fibers was performed on both the sediment and surface water samples. There was no asbestos detected in any of the samples.

SOIL

Four soil samples were collected from several areas around the site. SS-1 was taken downgradient of the large waste pile (see Figure 4-1) and had the highest concentrations of barium, calcium, and potassium. SS-2 was collected about 40 feet southeast of GW-2 had the highest concentrations of aluminum, cobalt, magnesium, and vanadium. SS-3 was taken from an area downgradient of a waste pile and exhibited the highest concentrations of cadmium, copper, iron and nickel. SS-4 was removed from a waste pile upgradient from SS-3. It had the highest concentrations of chromium and lead. There are no NYSDEC criteria for soils, therefore a comparison was made between those elements reported to be above the contract quantitation limits and the typical range of values for these elements found in native soils (Appendix A, Ref. 14). Only magnesium (in SS-2) was found to be above the range of values. As magnesium is not considered a toxic heavy metal, it is concluded that there is no contamination of toxic heavy metals in the soil samples.

Several unknown and tentatively identified semivolatile compounds, 4-hydroxy-4-methyl 2-pentanone (diacetone alcohol) and hexadecanoic acid were found in all 4 soil samples. These compounds were found in the associated blank for each sample. Estimated concentrations in soil for 4-hydroxy-4-methyl 2-pentanone ranged from 3000 to 4500 mg/kg. For hexadecanoic acid, concentrations ranged from 350 to 470 mg/kg. In addition, an estimated 910 mg/kg of benzaldehyde was discovered in SS-1. All may have been detected due to their usage in laboratory work, although benzaldehyde is used in dye manufacture, as a solvent for oils and resins and may be a result of the paper recycling process (Appendix A, Ref. 15).

Two volatile organic compounds found in SS-4 (methylene chloride, estimated 4 ug/L and 2-methylpropane, estimated 80 ug/L) were also found in the associated blank. One compound, 2-methylpropane, (estimated 11 ug/L) was found in sample SS-1 and in its associated blank. Isobutane is another name for 2-methylpropane. It is a common laboratory instrument calibration fluid (Appendix A, Ref. 15). As these substances were found in the laboratory blanks as well in the samples, their presence

is probably due to post-sampling contamination.

There was no pesticide or PCB contamination in any of the samples.

SLUDGE

Four of the seven sludge samples were analyzed for TCL metals, semivolatile organic compounds, volatile organic compounds, pesticides, PCB's and asbestos fibers. The remaining three sludge samples, SL 5-7, were analyzed for asbestos fibers only. SL-3, which was extracted about 220 feet downstream from the plant discharge pipe, had the highest levels of TCL metals of all four samples so tested. As there are no NYSDEC criteria for sludge, inorganic analytical results were compared to data compiled from E.P.A. documents (Appendix A, Ref. 16). In the cases of aluminum, chromium, copper and cyanide, no comparable sludge data was available. Iron and manganese concentrations in two sludge samples were greater than the mean municipal wastewater sludge concentration (13,000 mg/kg). The concentrations of nickel in SL-3 (677 mg/kg) were higher and slightly lower in SL-4 (309 mg/kg) than the mean of 320 mg/kg. Magnesium content in all except SL-1 were considerably higher than the mean value. Chromium (269 mg/kg), copper (114 mg/kg) and cyanide (15.5 mg/Kg) concentrations in SL-3 may merit attention, especially in the absence of any comparative data. Lead and copper content in site samples was considerably lower than that for municipal sludge. With the exception of nickel, lead and cyanide, none of the above substances are considered toxic heavy metals (Appendix A, Ref.15). Chromium is not considered toxic here because the analysis was for total chromium, not hexavalent.

Toluene, xylene, chloroform and 2-methynaphthalene were detected in sludge samples. Toluene was detected in both SL-1 (6100 ug/kg) and SL-3 (5000 ug/kg). Xylene (190 ug/kg) was found in SL-1 only. Chloroform (31 ug/kg) was found in SL-2. SL-1 which was collected from the settling lagoon about 40 feet from the plant effluent pipe had the highest concentrations of these solvents. All four samples

(SL-1 through SL-4) had reported concentrations of 2-methylnaphthalene that exceed the detection limits. SL-1 with a concentration of 140,000 ug/kg had the highest concentration of the four. This substance was also found in SW-2. It is associated with insecticides, organic synthesis and solvents. It may be derived from solvent use by the recycling plant. Bioaccumulation of 2-methylnaphthalene is known to occur in certain aquatic species such as the Rainbow Trout. This could have an adverse environmental impact should offsite migration occur. It is likely that solvents or lubricants used in the paper recycling process are being introduced to the surrounding surface water and possibly wetlands through the effluent pipe. There were no reported pesticides or PCB's in excess of the detection limits.

Four of the seven sludge samples analyzed for asbestos fibers tested positive for chrysotile (>1%). SL-2, which was taken about 140 feet down-stream from the plant discharge outlet, had the highest reported percentage of asbestos fibers (67% chrysotile). SL-7, which was sampled about 40 feet from the point where the lagoon and large pond merge, tested positive for chrysotile (44%). It should be noted that when chrysotile is present in a matrix of cellulose an underestimation of the percent present may occur (Appendix I). It is therefore conceivable to obtain negative results for chrysotile in a sample that contains cellulose fibers in the matrix.

In view of the presence of toluene, xylene, chloroform, 2-methylnaphthalene and asbestos in the samples, and the presence of 2-methylnapthalene in the surface water, it is concluded that the sludge requires further investigation and possible removal.

AIR .

None of the three air samples taken were reported positive for asbestos fibers. Because of the frozen condition of the sludge dredge piles, it is felt that the test results may be inconclusive. Any asbestos fibers would not be airborne and therefore any negative results may be suspect.

4.7.2 <u>RECOMMENDATIONS</u>

Based on the results of this investigation, it is recommended that additional investigations be conducted at the site, including:

- 1) A grid sampling and retesting of the lagoons to determine the extent of asbestos contamination.
- 2) Additional testing of the sediment from the lake and pond and the adjacent wetlands. Special attention should be given to the delta forming at the mouth of the lagoon where it empties into the large pond. Wetland sampling should be conducted in late winter or early spring after a significant runoff has occurred. Samples should be taken in the vicinity of high water marks near the culvert that enters the wetland from the small pond onsite.
- 3) The determination of the nature, extent and quantity of contaminated sludge and sediment. This should include locating sludge that had been buried onsite by Atlantic Asbestos, Inc.
- 4) Resampling of the air in the vicinity of the lagoons for asbestos fibers.
- 5) A study be undertaken to create a satisfactory means of disposing of the sludge.

APPENDIX A REFERENCES

New York State Department of Environmental Conservation 50 Wolf Road, Albany, New York 12233-1010

21 South Putt Corners Road New Paltz, NY 12561-1696 914-255-5453



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July 28, 1987

Berry A. Hull Red Hook Paper, Inc. 29 Linden Avenue Red Hook, NY 12571

Dear Mr. Hull:

Pursuant to our discussion on July 22, 1987 at your place, you agreed to the following:

- Immediate removal of white sludge/paper pulp from the grounds in the vicinity of asbestos bags.
- Proper removal and disposal of asbestos bags within the next two weeks. You are advised to remove these bags by August 9, 1987, otherwise enforcement action will be taken against you.
- Sampling of lagoons for asbestos. You will inform me about the sampling event at least one day before hand. It is understood that minimum of four samples will be taken from the lagoons.

If you have any questions or need clarification for the above, please contact me.

Sincerely,

Shaminder Singh

Assistant Sanitary Engineer

Region 3

SS:sp

cc: A. Klauss 🗸

D. Ruff/DCHD

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SPEED MEMO 21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561 914-255-5453 KLINII: MI 122/37 MS/SES Link TIC HCCK. FROM: __SHAMIN DEK SINGH 1114 SITE LISIT TODAY, CN SALL YELLOW MSBESTES BAGS ALL 75-100 ARCUN PROPERTY SOME OF THE BAGS WERE TCP - EXPCSING THEIR CCNITENTS ALSO, ATAICSPHEKE THERE WHS WHITS COLORED SLUDGE LYING ON THE 6 KOUN'S Coke Y TN ENGULKY, THE ISHUS. CUNER NEHK WASTE THIS WAS PROCESS MIE THAT I THINK PULP. THIS WAS THE MATERI T(ILIP (DCW) MENTIONED IN HIS MENIO TO REMOVE TOLD THE OWNER THIS STUFF IMMEDIATELY FROM THE CHOUND. IS BOING TO SHIP ALL THE BAGS BUFFALO NEXT TIND WES CANDFILL WITHIN THE THIS \mathcal{D}^{c} H5 DESS INCT WITHIN Tris ルジスア WEEKS, TICKETED. HE SINCUID 375 CLUMER IS ALSO CLUMING (MEGING) I TILLD LAGCORS. 7. +1//1 TAKE MINALYZE 700 11 FCX けいんとくてく SAMPLES TAND SHAPLING WITE THE CHINE TO THE KINGS 1. C. D.C. IN LOCALITY OF FREE PARTY 1.18

REFERENCES

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- 3. Harry R. Cedergren, "Seepage, Drainage, and Flow Nets", Second Edition, 1977, pp.67-77.
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- 13. Water Pollution Control Federation, Manual of Practice NO.11, "Operation of Wastewater Treatment Plants", 1976, p. 23.
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 Nostrand Reinhold Company, 1977.
- 16. United States Environmental Protection Agency, "Process Design Manual-Municipal Sludge Landfills", 1986, p.3-14.

RECEIVED

Red Hook Paper, Inc.

OCT 20 1966

24 LINDEN AVENUE RED HOOK, NEW YORK 12571 (914) 758-9200

NYS DEG REGION &

October 16, 1986

Mr. Shaminder P. singh Junior Engineer N.Y. Dept. of Environmental Conservation 21 South Putt Corners Rd. New Paltz, N.Y. 12571 12561-1696

Dear Mr. Singh:

In response to your letter dated august 21, 1986, I submit the following: I contacted Harlem Valley Landfill last month and they are not willing to accept the bagged asbestos. I have since contacted a number of other firms and I did locate one with a Part 364 Waste Hauler Permit who proposes to take the asbestos to a land fill in western New York. This will increase the overall costs considerably, but I see no alternative.

The yellow, approved bags for disposal of asbestos were on order for 3 weeks and finally arrived a short while ago. We have bagged part of it and will finish the job soon so that it can be hauled off to the land fill.

I will notify you just as soon as this is completed.

Yours truly,

Barry 4. Hull

43

Red Hook Paper, Inc.

24 LINDEN AVENUE RED HOOK, NEW YORK 12571 (914) 758-9200

August 11, 1 37

RECEIVED

1987

MYS CEC REGION 3

Mr. Shaninger Singh N.Y. State Dept. of Environmental Conservation Sl South Putt Corners Da. No. Palts, N.E. 12751-1785

Dear Mr. Singh:

Enclosed please find a copy of the 564 DEC permit sent to me recently by Coachman Carting, Inc. of Port Jervis, N.T. I've been in contact with Mr. Anthony Litrenta of this firm and they are ready to do the hauling within 48 - 72 hours of when I notify them.

I ordered one more box of the yellow, DEC approved bags inasmuch as several of the bags outside were ripped. These should be here sometime this week and we will rebag the damage ones and call Goachman Carting to pick them up. He is sending a 50 yard trailer which he says should accompdate all that we have. Mr. Litrenta also informed me that we should leave the bags open and wet the contents just a bit before he arrives so there will be no dust. We then tape the top of the bags shut and load them. If you should see anything out of order with the Goachman permit or the above instructions please contact me.

Just as soon as we ship the asbestos I'll contact you and we can arrange to take the samples from the lagoons.

Thanks and best regards.

Yours truly

Barry A. Hull

17-20-3 (10.85) - 26a

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF SOLID AND HAZARDOUS WASTE - BUREAU OF HAZARDOUS WASTE OPERATIONS 50 WILLE ROAD, ALBANY, NEW YORK 12233-4017



WASTE TRANSPORTER PERMIT

Pursuant to 6 NYCRR Part 364 No. of Additional Sheets Attached

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federal, state or local regulations.

Please refer to warning notice on back of this Permit.



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF SOLID AND HAZARDOUS WASTE - BUREAU OF HAZARDOUS WASTE OPERATIONS 50 WOLF ROAD, ALBANY, NEW YORK 12233-4017

WASTE TRANSPORTER PERMIT

Pursuant to 6 NYCRR Part 364 No. of Additional Sheets Attached NYSDEC PERMIT NUMBER EPA TRANSPORTER ID NUMBER VEHICLE STATE & LICENSE NUMBER 3A-163 SEE LIST OF VEHICLES THIS IS TO CERTIFY THAT: BUSINESS NAME COACHMAN CARTING, INC. MAILING ADDRESS ECX-4CE HAMILTON STREET CITY COUNTY STATE ZIP CODE PORT JERVIS CRANCE 12771 Having complied with the provisions of Environmental Conservation Law Title 3, of Article 27, is hereby authorized to engage in waste transporting within the State of New York in the manner described herein. TYPE OF WASTE AND LOCATION OF TREATMENT, STORAGE OR DISPOSAL FACILITY: CONDITION: PENNSYLVANIA DEPT. OF ENVIRONMENTAL RESOURCES HAS INFORMED NIY.S.-D.E.C. THAT KEYSTONE LANDFILL IN DUNMORE - PA IS NOT PERMITTED TO ACCEPT N816-CONTAMINATED DIRT, SCIL OR SAND, THEREFORE, THE KEYSTONE LANDFILL HAS EEEN DELETED FROM THIS PERMIT. ENC OF CONDITIONS *****

> PAGE 5 OF 6 PAGES

THIS PERMIT WILL EXPIRE AT MIDNICHT	SEPTEMBER	30	_ 19 _	ć 7	and is subject to revocation at any time. This pern	nit is not tra	insferrable.
In witness whereof, the Department of Environme	ental Conservation has caused thi					19	87
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NOTE: This Permit does not relieve the transporter of the responsibility of complying with any other applicable federal, state or local regulations. Please refer to warning notice on back of this Permit.

47-20-3 (10.85) - 26a

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF SOLID AND HAZARDOUS WASTE - BUREAU OF HAZARDOUS WASTE OPERATIONS 50 WOLF ROAD, ALBANY, NEW YORK 12233-4017



WASTE TRANSPORTER PERMIT

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			By Swan L	Benjamin	
			New York State Department of Env	ironmental Conservation Representative	

NOTE: This Permit does not relieve the transporter of the responsibility of complying with any other applicable federal, state or local regulations. Please refer to warning notice on back of this Permit.

47-20-3 (10/85) - 26a

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF SOLID AND HAZARDOUS WASTE - BUREAU OF HAZARDOUS WASTE OPERATIONS 50 WOLF ROAD, ALBANY, NEW YORK 12233-4017

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WASTE TRANSPORTER PERMIT

Pursuant to 6 NYCRR Part 364

No. of Additional Sheets Attached

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3A-103		SEE LIST OF VEHICLES
THIS IS TO CERTIFY THAT:		
BUSINESS NAME		
COACHMAN CARTING, INC.	•	
LOX-405 HAMILTON STREET		
CITY	COUNTY	STATE ZIP CODE
Having complied with the provi	CERNGE risions of Environmental Conservation Law Ti	1 NY 12771
to engage in waste transporting	ng within the State of New York in the mann	tie 3, of Article 27, is hereby authorized her described herein.
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NOTE: This Permit does not re	lieve the transporter of the responsibilit	ty of complying with any other applicable

Please refer to warning notice on back of this Permit.

federal, state or local regulations.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF SOLID AND HAZARDOUS WASTE - BUREAU OF HAZARDOUS WASTE OPERATIONS 50 WOLF ROAD, ALBANY, NEW YORK 12233-4017

WASTE TRANSPORTER PERMIT

Pursuant to 6 NYCRR Part 364

No. of Additional Sheets Attaches

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ECX-403 HAMILTON STRES	COUNTY			STATE ZIP	CODE
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federal, state or local regulations.

Please refer to warning notice on back of this Permit.

-20-2 (10.65) - 204

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF SOLID AND HAZARDOUS WASTE - BUREAU OF HAZARDOUS WASTE OPERATIONS 50 WOLF ROAD, ALBANY, NEW YORK 12233-4017

WASTE TRANSPORTER PERMIT

Pursuant to 6 NYCRR Part 364 No. of Additional Sheets Attached

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federal, state or local regulations.

Please refer to warning notice on back of this Permit.

DUTCHESS COUNTY HEALTH DEPARTMENT

MEMORANDUM

TO: File

FROM: J.T. NApol.

SUBJECT: Atlantic Asbestes (T) Red Hook

DATE: 4/15/77

ON this date an inspection was made of the Above named facility in regard to a complaint by Mr. Joseph Focea who resides on spring Lake Read That a point owned by Atlantic Asbestes had overflowed its banks and and flooded his property. Mr. Focea was present at the time of inspection. Also present were Jack Railing and myself fix inspection of Focea property from revealed that the property was not flooded but slightly wet.

We Also MET with Mr. Blanchard, A plant employee who informed us that during periods of heavy rainfall. The small food adjacent to the plant from which it draws its water sometimes overflows its banks and flow into a nearby ditch. (See Attached sketch). At the time of this inspection there were no discharges or overflow into any existing streams or adjacent property. A substantial amount of uncovered asbests resulting from dredging operations was dumped on to the grown surface near the settling trendies in the vicinity of the clischarge pipe from the plant. We value which permits the flow of water from the large pand into the smaller pend was open.

DC: ADM 7 HD - 131



November 13, 1979

Mr. Cesare J. Manfredi, P. E.
Senior Sanitary Engineer
New York State Department
of Environmental Conservation
202 Mamaroneck Avenue
White Plains, New York 10601

RECEIVED

NOV 1 6 1979

N.Y.S. D.E.C. WHITE PLAINS OFFICE

RE: Atlantic Asbestos Paper Mill
Upper Red Hook, Dutchess County,
New York

Dear Mr. Manfredi:

In response to your letter dated October 12, 1979, and our subsequent conversations, we have prepared some descriptive information and performance data on the above-referenced facility.

The subject paper mill is located in Upper Red Hook, Dutchess County, New York, one mile east of Route 9 - refer to attached location map. The facility has been and is family-owned and operated since its founding in 1946.

The mill manufactures two types of paper products. Bogus paper which is utilized as a packaging paper, is manufactured from recycled newsprint, magazines and books. Asbestos paper is also manufactured on a limited basis and is sold for insulation uses. It is manufactured utilizing virgin and reclaimed asbestos fibers, reclaimed newsprint and a small amount of cornstarch solution.

Due to a general slow-down in the contracting business, especially regarding the use of asbestos products, the mill has operated very little during the past few years. In fact, the facility is currently for sale.

Facility Description:

A general site plan of the mill and ponds is attached. The mill draws process water from Point #1 in the "clean pond". The pump's capacity is approximately 500 gpm. Approximately 20% of the water is used up by the process with a resultant discharge of 400 gpm. Process water is discharged through a $3\frac{1}{2}$ " pipe at Point #2 into a long trench approximately 400 feet long by 12 feet wide by 8 feet deep (varies). This trench serves as a settling

Mr. Cesare J. Manfredi, P. E.

November 13, 1979

zone for removal of the solids in the process water prior to flowing into the large pond area at Point #3. As can be noted, the large pond is contiguous with the smaller pond, creating a closed loop flow.

Water samples were taken on October 17, 1979 at four locations: wastewater discharge pipe at ditch (Point #2), at the clean pond (Point #1) for both manufacturing processes - i.e. bogus paper and asbestos paper. A sample was also taken from the bathroom tap, representing well water on the property. Tests were performed for the following parameters: BOD, chloride, COD, specific conductance, total hardness, pH, total suspended solids, total dissolved solids, cadmium, total iron, lead and silver. All test results are attached.

We trust that this submittal provides a basic information and data base for your review. If you have further questions, please call me.

Very truly yours,

WEHRAN ENGINEERING, P. C.

Dennis G. Fenn, P. E.

Vice-President

DGF/mef Encl.

cc: W. J. Fenn

DUTCHESS COUNTY HEALTH DEPARTMENT

<u>MEMORANDUM</u>

TO: VACK RAIling

FROM: JIM NAPOLI

SUBJECT: Atlantic Asbestos - T. Red Hook

DATE: 8/4/18

ON 8/3/18 This writer visited the Above referenced facility to investigate possible

surface discharges. The plant was closed AND we was Around. Most of the boundary of the lake was investigated atthough very dense vegetation growth prevented a complete boundary investigation from being made.

From what was absenced there were no surface discharges. As mentioned an reports of previous investigations The lake is connected to a small point on the opposite

iside of Spring Lake Road by a culvert. It appears Prat Mrs poud has No ther

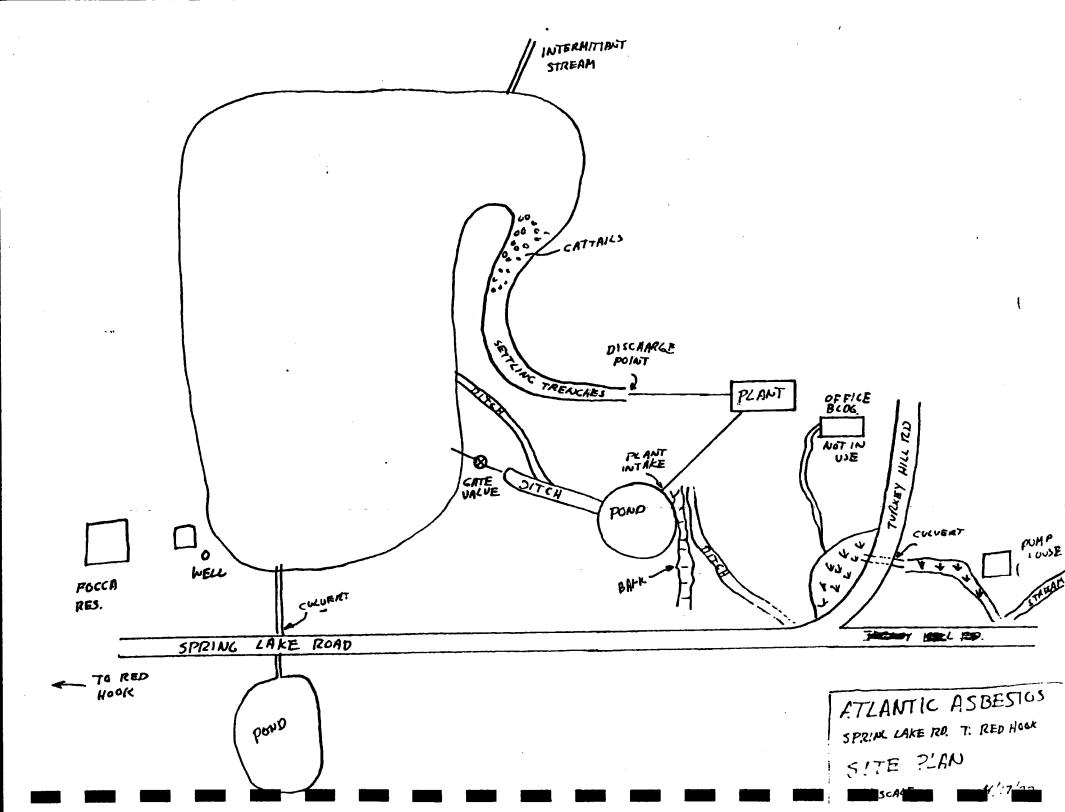
·mlat or outlet.

of the water in the lake rise high enough it will flow by grawly into Asmall pond wested west to the plant. The water could also be regulated by A gate value. There is A possibility that a discharge could occur if the water level in the pond rose high everyh Doverflow its banks. The water would then flow into A ditch and eventually find

its way to A stream which crosses Turkey HIII Road.

The settling trenches were dry and it appeared that they had not been used for several

days or longer.



August 21, 1978

Mr. Ralph E. Stewart, Chief Housing Hygiene Section New York State Health Department Tower Building - Empire State Plaza Albany, New York 12237

> Re: Joseph Focca Property Spring Lake Road T. Red Hook

Dear Mr. Stewart:

This is to confirm our phone conversation of August 18, 1978 concerning Mr. Focca's complaint that the Atlantic Asbestos Company was polluting his property by discharging lake water onto his property, said lake water being the discharge point for the Atlantic Asbestos industrial waste. Be advised that our inspections over the last two years have not produced any concrete evidence establishing any violation. It appears that Mr. Focca's complaint is unjustified. However, we have attempted to contact Atlantic Asbestos to discuss the possibility of a need for a SPDES Permit for the discharge from this lake which periodically occurs during periods of high runoff. If you will note on the attached sketch, the lake is wholly contained on the Atlantic Asbestos property. The overflow from the lake flows either through a gate valve or over the banks of the lake through an existing trench to a secondary settling pond which then must also overflow for the waters to reach the stream running under Spring Lake road. Because of the elevations of the gate valve and the trench, it is the writer's opinion that it is impossible for the lake water and thus any asbestos residue to flow onto Mr. Focca's property.

It is the Department's opinion therefore, that the only problem existing with the Atlantic Asbestos Company is the possible need for a SPDES Permit for this intermittent discharge. As I mentioned on the phone, Atlantic Asbestos, for whatever reason, is closed down at this time. During September, 1978 we will be re-inspecting the site to issue any directives that may be necessary under the Environmental Conservation Law.

If you have any further questions concerning this matter, please contact the writer directly at 485-9768 or Mr. James Napoli of this Department at 485-9821.

jrh/jer/bg cc: James Napoli cc: Al Reilley - WPRO Enc. Very truly yours, Jack R. Hill Public Health Administrator

John E. Railing, P.E. Senior Public Health Engineer Div. of Environ. Health Services REFERENCE 3

Seepage, Drainage, and Flow Nets

SECOND EDITION

HARRY R. CEDERGREN

A WILEY-INTERSCIENCE PUBLICATION

C-1977

	Condition	Diagram	Shape factor, F	Permeability, k by variable head test	Applicability
isotropic strutum	(a) Unrased hole	D A2 A1	F = 16+DSR Shape from Cofficient	(for observation well of constant $k = \frac{R}{\sqrt{(h_1 - h_1)}}$	<u></u>
saturated	(b) Cased hole, soil flush with bottom	Casing D A A A A A A A A A A A A A A A A A A	$F = \frac{11R}{2}$	$k = \frac{2\pi R}{11(t_2 - t_1)} \ln\left(\frac{h_1}{h_2}\right)$ for 6 in. $\leq D \leq 60$ in.	Used for permea- bility determination at shallow depths below the water table; may yield un- reliable results in falling head test with silting of bottom of hole
n well or piczometer in of infinite	(c) Cased hole, un- cased or perfor- ated extension of length L	Casing A2 A1	$F = \frac{2\pi L}{\ln\left(L/R\right)}$	$k = \frac{R^2}{2L(t_1 - t_1)} \ln\left(\frac{L}{R}\right) \ln\left(\frac{h_1}{h_1}\right)$ for $\frac{L}{R} > 8$	Used for permea- bility determinations at greater depths be- low water table
Observation	(d) Cased hole, col- umn of soil inside casing to height L	Casing h2 h1	$F = \frac{11\pi R^2}{2\pi R + 11L}$	$k = \frac{2\pi R + 11L}{11(t_2 - t_1)} \ln \frac{h_1}{h_2}$	Principal use is for permeability in ver- tical direction in anisotropic soils

	Condition	Diagram	Shape factor, F	Permeability, k by variable head test	Applicability
er with impervious	(e) Cased hole, opening flush with upper boundary of aquifer of infinite depth	Casing Line And Line	F = 4R	$k = \frac{\pi R}{4(t_2 - t_1)} \ln \left(\frac{h_1}{h_2} \right)$	Used for permea- bility determination when surface im- pervious layer is relatively thin; may yield unreliable re- sults in falling hend test with silting of bottom of hole
picrometer in aquifer upper layer	(f) Cased hole, un- rased or perfor- ated extension in- to aquifer of finite thickness: (1) \(\frac{f_0}{T}\) \(\leq 0.20\)	/2R	$F = C_s R$	$k = \frac{\pi R}{C_{*}(t_{2} - t_{1})} \ln \left(\frac{h_{1}}{h_{2}}\right)$	Used for permen- bility determinations at depths greater than about 5 ft, for 'values of C', see Fig. 2.16
well or pictom	(2) $0.2 < \frac{L_2}{T} < 0.85$ (3) $\frac{L_2}{T} = 1.00$	County And Land	$F = \frac{2\pi L_2}{\ln (L_2/R)}$	$k = \frac{R^2 \ln \left(\frac{L_2}{R} \right)}{2L_2 \left(\frac{L_2}{L} - \frac{L_1}{L_1} \right)} \ln \left(\frac{h_1}{h_2} \right)$ $\text{for } \frac{L_2}{R} > 8$	Used for permea- bility determinations at greater depths and for fine grained suits using porous intake point of pi- ezometer
Observation w	Note. Re equals effective radius to source at constant head	Ro	$F = \frac{2\pi L_3}{\ln (R_0/R)}$	$k = \frac{R^2 \ln (R_0/R)}{2L_1(l_2 - l_1)} \ln \left(\frac{h_1}{h_1}\right)$	Assume value of $\frac{R_0}{R}$ = 200 for estimates unless observations wells are made to determine actual value of R_0

United States Environmental Protection Agency

Robert S. Kerr Environmental Research Laboratory Ada OK 74820

Center for Environmental Hosparch Information Cincinnati OH 45268

Technology Transfer

SEPA

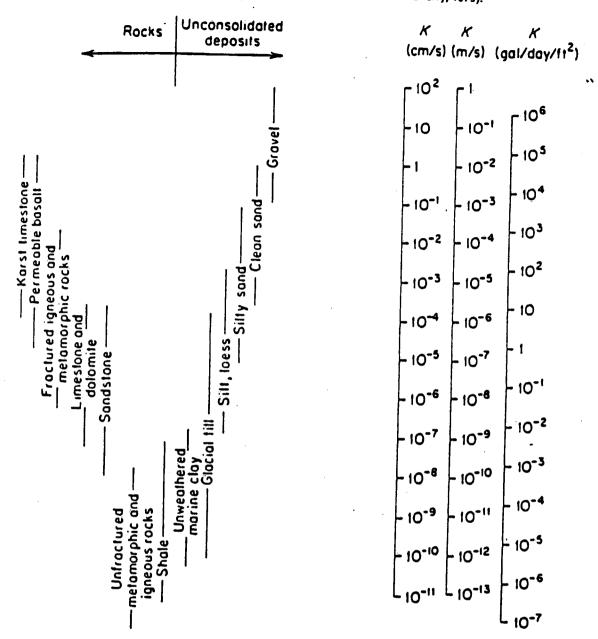
EPA/625/6-87/016

Handbook

Ground Water

YEC, INC. Forest View Professional Buildin, 10 Pine Crest Road Valley Cottage, NY 10989 REFERENCE 4

Table 1-3 Range of Values of Hydraulic Conductivity (adapted rom Freeze and Cherry, 1979).



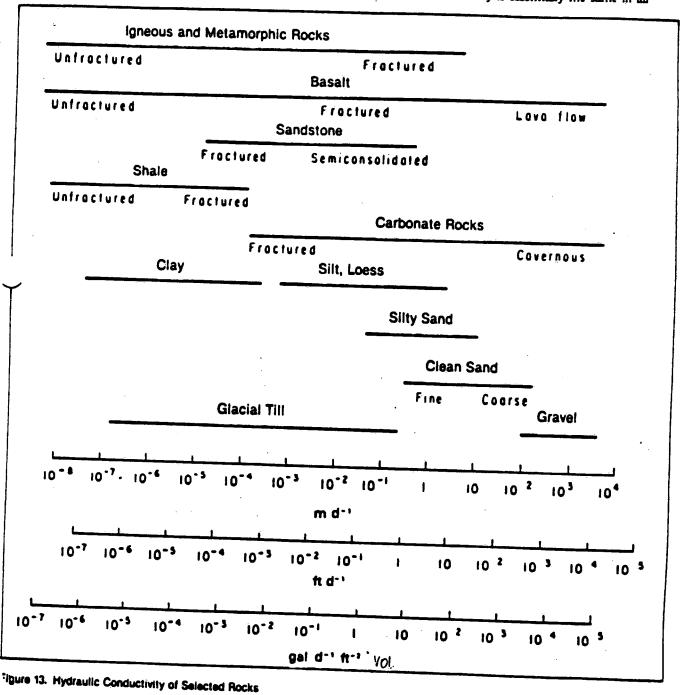
REFERENCE 5

of time (commonly, a day) under a unit hydraulic gradient (such as a meter per meter) through a unit area (such as a square meter). Figure 12 illutrates these factors. Expressing hydraulic conductivity in terms of a unit gradient, rather than of an actual gradient at some place in an aquifer, permits ready comparison of values of hydraulic conductivity for different rocks.

Hydraulic conductivity replaces the term "field coefficient of permeability" and should be used in referring to the water-transmitting characteristic of material in quantitative terms. It is still common practice to refer in qualitative terms to "permeable" and "impermeable" material.

Figure 13 shows that the hydraulic conductivity of rocks ranges through 12 orders of magnitude. There are few physical parameters whose values range so widely. Hydraulic conductivity is not only different in different's Sime. types of rocks but may also be different from place to financial place in the same rock. If the hydraulic conductivity is essentially the same in any area, the aquifer in that area is said to be homogeneous. If, on the other hand, the hydraulic conductivity differs from one part of the area to another, the aquifer is said to be heterogeneous. And with

Hydraulic conductivity may also be different in different directions at any place in an aquifer. If the 72.100 hydraulic conductivity is essentially the same in all



January 10, 1978

Dr. George P. Thelen N.Y.S. Dept. of Health E mp ire S tate Pla za Tower Building Albany, N.Y. 12237

Dear Dr. G.P. Whalen:

I have a problem. The water from the pend adjacent to my property is contaminated and it is flooding my property. This p end is on property owned by the Atlantic Asbestos Co.. Spring Lake Rd. Red Hook, N.Y.

I probably noticed this condition last S ring when the snow thawed. There was a large pool of water on my property with many dead fish in it. E vidently the pend overflowed onto my property. I notified the maintenance man of the Atlantic Asbestos Co. about this condition. He said he could not control it, that maybe they were have the land surrounding the pend on the other side filled in. He notified his boss Mr. Fenn, Bayside, M.Y. He came up and observed the condition, but aid nothing about it. In March 177 a Peter P. Mackand Jack Railing P.H. E naineer from Public Health Dept. came up to investigate the matter, and still nothing was done to rectify the water coming in my property.

This water was put in to make a good in the 1850's. The Atlantic Asbestos Co. was then caned by a Mr. Marovich. He asked my mother, Maro Fleca if she would consent to have the water put adjacent to her property. If he agreed. At that time Joseph Coma, Maintenance supervisor used to regulate a valve so that when the water reached a certain level, it would reced. It never came on my projecty. New, J. Communis deceased and Beatrice Mlacinich now is the owner of the Atlantic Asbestos Co.

I have a friendling to a soulthing fighted in City come to Rea Hour to inversign to this outsided . e sain that it was illegal to have a valve preventing the free flow of actor.

I have been a plumber in Brooklyn for ever UO yrs. and am knowledgeable about Sanitary condities. Yesterday by property was flooded again and there as later in by garage which is adjacent to this lend. I took a test of the later, using the reagent, cratal Violet, and found the water contaminating the reagent, cratal Violet, and found the water contaminating the reagent, cratal Violet, and found the water contaminating the reagent, cratal Violet, and found the water contaminating the reagent, cratal Violet, and found the water contaminating the reagent, cratal Violet, and found the water contaminating the reagent of the contaminating the reagent of the contamination of the contaminating the reagent of the contaminating the contaminatin ated.

In sife and I went to see Mr. Hill of the Intchess County Dept. of Health in Pourhkeepsiconec again. "e had gone there in the Spring of 1977 about this same matter. After several trips we were finally interviewed by Mr. Mill and Dr. Anderson. From the onset of the mediang Mr. Hill assumed a very pedantic attitude toward us, talking loucky and assumed a very pedantic attitude towerd us, thirting long the environment. blowing eight smoke around the room, polluting the environment. He was very sarchetic and said he was sick of people who were generally ignorant and upigs". He finds his job very disagreeable, he said. However, Dr. Anderson said he would send someone up to investigate. I never saw anyone although the some someone up to investigate. Mr. Hill told me at a later date the one of his "men" came up and we had no legitimate complaint.

Yesterday Mr. Hill was on the defensive from the time I entered the Pept. He inferred I was losing my memory and made sure the whole office heard it. He said I could only speak to him "upon appointment." My wife was almost reduced to tears in front of all those people.

I pay taxes and have been for many years and Thank God I am able to. These taxes help to pay ir. Hills! salary. We expect respect when we ask a civil question. Mr. Hill seems to enjoy "buiting" people. I wonder if he would have the same attitude if he was outside the building.

Most important, I would like this condition of conteminated mater and "Gord" fish on my property rectified. Please give this matter y ur attention.

Thank you and may I hear from you at your earliest convenience.

Joseph Focca

Spring Lake Road Red Hook, N.Y. 12571 Phone Number 914-758-1255 REFERENCE 7

New York State Department of Environmental Conservation .21 South Putt Corners Road, New Paltz, New York 12561

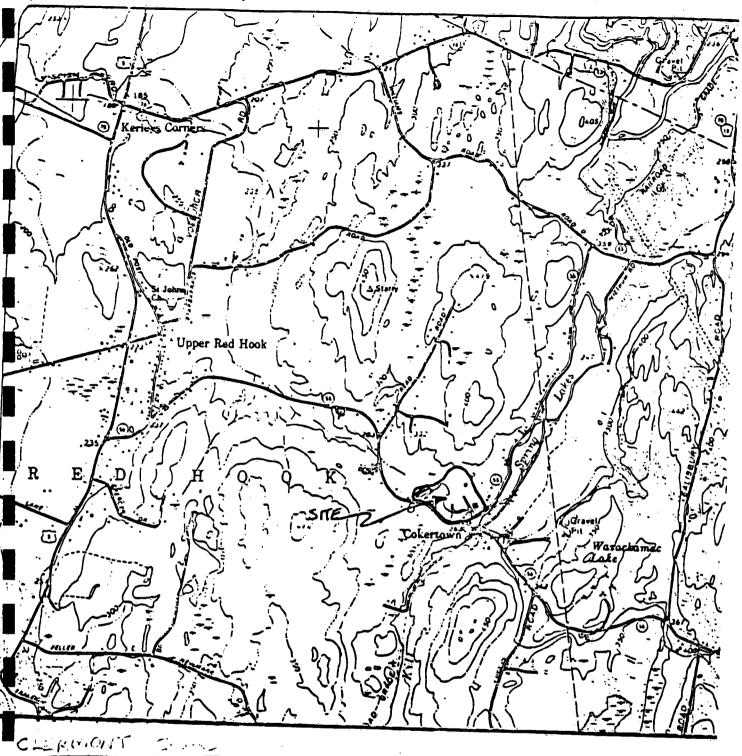
Division of Regulatory Affairs (914) 255-5453 or (914) 255-3121

October 5, 1989



Commissioner Location: 300) Based upon your inquiry of The stream(s)/pond(s) you indicated has/have a classification of: herefore; a permit is required (application form enclosed) a permit is not required to physically disturb the bed or banks of this/these stream(s)/pond(s). If a permit is not required, please note, however, that any project undertaken should not contravene the water quality standards of the creek. Care should be taken to stabilize the disturbed areas promptly after construction, and all necessary precautions should be taken to prevent contamination of the creek by silt, sediment, fuels, solvents, lubricants, or any other pollutant associated with the project. The stream/pond you have identified does not appear on our US Geological Survey map. Therefore, if there is year-round flow, the stream takes on the classification of the atercourse into which it feeds, is / is not required. If the stream runs intermittently (seasonally), it is classified "D", and a permit is not required. Your project/site is near or in Freshwater Wetland Revende. Be aware that a permit is required for any physical disturbance within these boundaries or within the 100 foot djacent area. To have the boundary delineated, please read the attached notice. Your project/site is not in a New York State protected Freshwater Wetland. However, please contact your Town Officials and the United States Army Corps of Engineers in New ork City, telephone (212) 264-0184, for any permitting they might require. Witlands smaller than 12 yacres.

The Person
The Department does not issue SPDES permits at this time for stormwater discharges unless these discharges occur at industrial facilities and there is evidence that they contain either toxic contaminants or priority pollutants. This is not the case for this facility. Based on the information you provided, the Department considers the discharge at your facility a non-contaminated source for this
at your facility a non-contaminated source for which it has no permit jurisdiction at this time.
Other DEC permits appear necessary. Submit applications (enclosed) for the following permits:
have reason to believe that all permits should not be processed simultaneously, please
The contract person below, clearly stating your reasons.
The map you provided is not sufficient to determine the location of your property.
Please provide a portion of a Town or County Highway map showing the entire surrounding area.
You have not sufficiently defined your concerns for us to answer you specifically.
Please provide further details of the proposed activity. (i.e. location map, description of work, etc.)
X les obtes something
See Notes in margins of each map Wetlands
listed are 124 or larger These are the only
size wethings on our many & sisterted by
the Department.
- Eller the Department does not have constal
withouts, however we do have tidal withouts.
These are no tidal wetlands in Dutchess County
Your inquiry has been referred to the following agency/individual for
information/action, as appropriate:
•
Please note that this letter only addresses the requirement for the following permits:
and that other permits from this Department may be required for projects conducted on this property now or in the future.
Your interest in undertaking an environmentally sound project is appreciated.
Sincerely,
Cently X. Lianna.
Regulatory Affairs Region 3
Information/Permit Materials/Map/Regulations Attached.



7 Wetlands whin I mile Radius

2M-7 CM-14

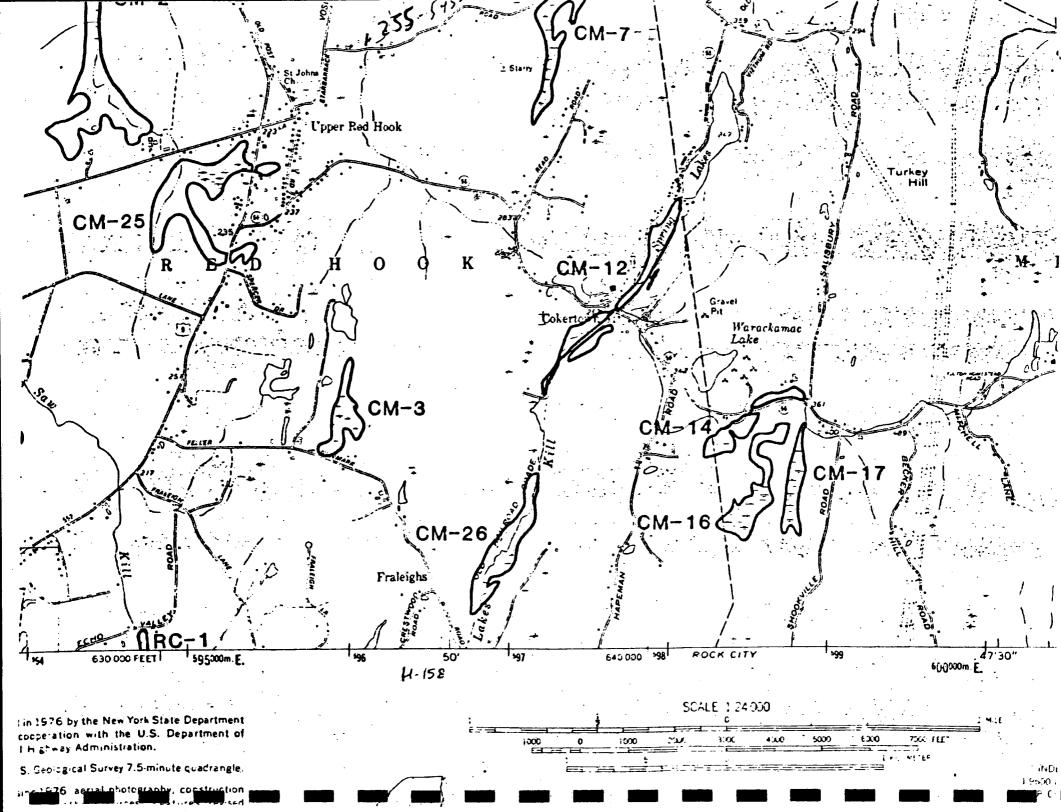
cm-16 cm-26 cm-17 cm-3 PHASE II INVESTIGATION NYSDEC ID No.: 314019

Site Location Plan

FIGURE 1

III sir z 1989

Noseph Steeley



REFERENCE 8

ATLANTIC ASSESTOS RED HOOK 514019

WEHRAN ENGINEERING
Consulting Engineers

PHASE I INVESTIGATION REPORT
ATLANTIC ASBESTOS
RED HOOK, NEW YORK
SEPTEMBER, 1984

// Atlantic Asbestos Corp.

PAPER MANUFACTURERS

P. Q. BOX 143 TUCKAHOE, NEW YORK 10707

Telephone: (914) 793-1207

202 - 11 2300 CUR

April 21, 1977 11 34 C

Elio

Dutchess County Health Dept.

22 Market St.

Foughkeepsie, N.Y. 12601

Ar. Jack Railing

RE: Complaints by J. Facca against Atlantic Asbestos Corp.

Dear Fr. Railing,

I wish to acquaint you with all the facts and background concerning the numerous complaints to your office by Mr. J. Facca.

The paper mill was installed at the present location in 1946 and became operational with a closed recycling water in about 1950. The system was expanded and ungraded in order that no pollutant water was discharged into the brook across the road, from which we draw water when our pond needs replenishing and nature does not provide an adequate amount. The gate valve and high water overflow were installed to control the water so that it did not overflow its banks.

For many years since this operation began, water samples were taken by the Conservation Dept. and your own Dept. We have not seen anyone taking samples for the past several years. I do not know why the tests were made.

The complainant started complaining in 1974 in March or April and continued every spring up to this year. The flooding started after the CountyDept. of Public Works resurfaced and widened county road #56. At this time a large drain pipe about 3' or 4' in diameter was installed or a smaller one was increased in size with the pitch draining into our pond. I contacted Fr. Um. Smith of Dutchess Cty. Highway Dept. who will view this condition.

We also are the recipients of the drainage from springs on property which is higher than us and owned by others. These springs were pushing out more water than we need for our mill. We even get water which drains off Facca's property and through a pipe under his driveway.

He have not drawn water from the brook across the road since last September.

J.C.H.D. received Mr. Facca's first complaint this year on March 10.1977
and on March 11,1977. Mr. Tom Mayster visited our Mill. Mr. Facca alleged that our pend overflowed the mesterly bank, his easterly boundry and deposited

enders and agreements continuent upon stable is perference, excellents and other unitsocialize decipie, exceed and over which we bese no control.

about j' to h' of water on his property. See plan view drawing "A". At that time the water level was about h' below the top of the bank. Mr. Rayster informed Mr. Facca that we were not in violation and recommended that Mr. Facca fill in his land.

3/12/77 Facca complained to Blanchard

3/14/77 Harry Euiler went to Facca's land and could not verify his complaint

3/15/77 I met with T. Rayster and we walked the entire system, vicued the bank on Facca's boundry. Water was about 4" below bank top, and overflow was running profusly. A pond of water was on Facca's land but was not an overflow but instead was because he has this low spot and normal rain and ice thawing will flood the low part of his land.

3/21/77 Facca said water effecting his garage. He also said that two federal men were looking for us and had summons for both Blanchard and Euiler. This was a fixation with him.

3/21/77 Mr. Blanchard went with him, saw his garage, saw no water from a hair-line crack which was dry but did see some water on floor, not near crack, and appeared to be a roof leak.

3/22/77 Snew and rain.

3/23/77 Facca again called i.c. crack in garage floor. We ignored his complaint. We checked his bank, water was well below bank, and was moving over our high water overflow. He said he would contact his lawyer and have me arrested. I received no contact from any lawyer.

We had rain on March 28& 31, April 1,2,4. & 5

Ly6/77 Joe in High nervous state came to the mill and said that he had an 5000.00 cable in his garage which got ruined by water coming through his garage floor and says that we are responsible. Joe Facca assaulted Al and became very nasty. Al Blanchard contacted the M.Y.S. Police trooper James Morkan to put the incident on record so that he could protect himself.

1/11/77 J.J.H.D. T. Rayster come to answer another complaint. He informed Facca that we were not in violation.

L/11/77 Corgaret Facca came to mill and asked both Al Blanchard and Harry Eucler to be tolerant with her husband and not to hurt him. She also said that he is an epéleptic and has a plate in his head.

4/12/77 We opened Gate valve.

1/15/77 Another Complaint by Facca saying we were depositing water on his land. Our investigation revealed that he had no water on his land for at least ours. On this date. In. Eng. Jack willing and Ass. Ing. visited our land and viewed our system, comp. Tas interviewed. (No water on his property.) Al Blanchard was interviewed by J. Bailing and stated that during heavy rains with the date valve closed, the high water overflow filled up the lower mond and caused everflowing. This is an act of God and definitely not interprional on our part. We realize that our system is a closed system and realized the months flarch and sometimes in world, depending only occurs during the months flarch and sometimes in world, depending on the severity of mature.

11/15/77 Tried to contact J. Railing. Too late.

1/18/77 Spoke to Railing at his office. He did not indicate complainant wrong; however did suggest to get a state permit, (Art. 17) to discharge water and we could open the gate valve to satisfy the whim of the complainant. I told him that this would not be possible as it would return re—cycled water too soon and defeat the purpose of the closed system.

Railing further said that T. Rayster had said we overflowed our banks and flooded facca's land. This is not true (verified 4/19/77 via phone by Rayster - perhaps a misunderstanding). Rayster said he never saw a violation at all his visits. He recognized that facca's land was low and suggested

he fill it 中。

1/17/77 1PM Called Railing - he was busy and I spoke to J. Mapoli 2:45 PM Called Railing - he was busy and I spoke to J. Mapoli who said Mr. Hill would contact me. Also stated it would be impossible to see Railing because he was all tied up and would leave for Mich. at end of week.

4/20/77 Spoke to Railing - made an appointment for 1 PM 1/21/77 at his office with Mr. Hill. He again said he understood Rayster to say we were in violation and overflowed our West Bank onto Mr. Facca's property. I again suggested he contact Mr. Rayster that this was not true information.

L/19/77 I checked with the State Police Trooper J. Horkan and was informed that he had several calls on Mr. J. Facca by his wife because of his irrationality. He said his wife said that Facca was an epileptic and had a plate in his head.

In conclusion, it is the opinion of the undersigned that the allegation by the complainant is not substantiated and he should be notified accordingly. We have asked him to stay off our property and have indicated this to his wife. In my opinion, this person needs medical help and not summary action by law enforcement.

Atlantic Asbestos Arp.

Skailing Je wil Walter J. Fenn

N.B. The precipitation from station LHUC (Hudson) stated that March had 5.9" of rain and 15.2" of snow.

DUTCHESS COUNTY HEALTH DEPARTMENT

MEMORANDUM

TO: Fike

FROM: J.T. NApol.

SUBJECT: Atlantic Aspertes (7) Red Look

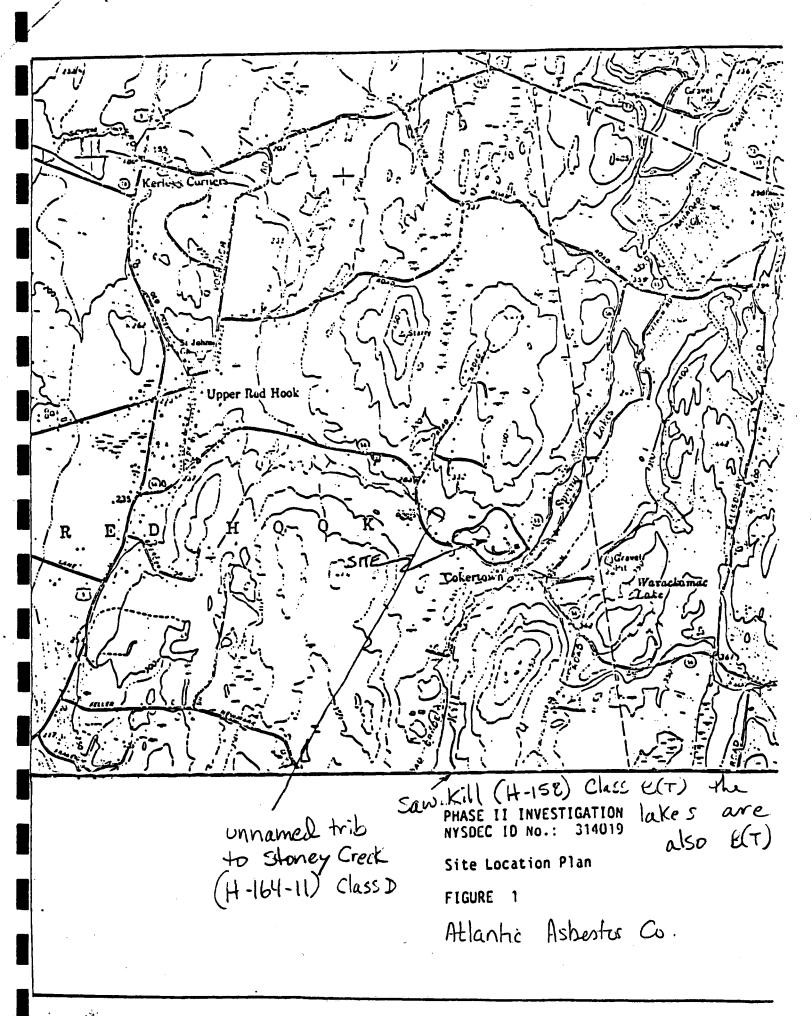
DATE: 4/15/??

On this date an inspectral was inade of the Atore named facility in regard to a complaint by Mr. Joseph Foca who resides on spring Lake Resid That a focuse owned by Atlantic Asbestus had over flowed its banks and and flooded his property. Mr. Foca a was present at the time of aspection. Also prove were just straing own myself. An inspection of Foca property seet morale that the property was not flooded but slightly wet.

We showed with Mr. Blanchard a plant employer were aformed as last during prieds of heavy rankall sine email found ad acoust to the plant from which it draws its water cometimes overflow its trains and flow rates a mercy discharge or strained exactly. At the time of this inspecties there were no discharge or war flow rate may existing stranges or adjusted property. A substantial imment of uncovered aspects resulting from tredging specialisms was demped on to be grown surface near the suffering transmiss in the number of the customary paper from the plant. The value waves pormally fix flow of water free customary paper from the plant. The value waves promise fix flow of water free target part into the smaller point was spen.

REFERENCE 9

Speed Messige To Ar: Selva Kumar WilsonJones Ari Selvakumar, Ph.D. Staff Engineer



REFERENCE 10

PROPERTY OF
U. S. GEOLOGICAL SURVEY
WRD, ALBANY, N. Y.

STATE OF NEW YORK
DEPARTMENT OF CONSERVATION
WATER RESOURCES COMMISSION

U. S. GEOLOGICAL SURVEY
343 U. S. POST OFFICE & COURT HOUSE
POST OFFICE BOX 1350
ALBANY, NEW YORK 12201

Ground-Water Resourses of Dutchess County, New York

By

E. T. SIMMONS, I. G. GROSSMAN, AND R. C. HEATH
Geologists, U. S. Geological Survey



Prepared by the
U. S. GEOLOGICAL SURVEY
in cooperation with the

NEW YORK WATER RESOURCES COMMISSION

174.76 3

ALBANY, N. Y.

GROUND-WATER RESOURCES OF DUTCHESS COUNTY, NEW YORK

By

E. T. Simmons, I. G. Grossman, and R. C. Heath Geologists, U. S. Geological Survey

ABSTRACT

Dutchess County encompasses an area of about 800 square miles in the southeastern part of New York State. The climate is humid continental. The mean monthly temperature is about 49°F and the mean annual precipitation is about 45 inches.

Ground water is obtained from unconsolidated surficial deposits and from bedrock. The unconsolidated deposits consist chiefly of unstratified till, and stratified clay, silt, sand, and gravel. The till ranges in thickness from less than I foot to more than 100 feet and underlies most of the uplands and some valley areas. The stratified deposits generally range in thickness from a few feet to as much as 200 feet and are chiefly restricted to valley areas. In the major valleys, large supplies adequate for municipal and industrial needs can be obtained from stratified deposits of sand and gravel. In upland areas, small supplies for domestic and farm needs may be obtained from large-diameter wells penetrating till.

The consolidated rocks range in age from Precambrian to Ordovician and in degree of metamorphism from highly metamorphosed rocks in the southeast to slightly altered rocks in the northwest. Argillaceous rocks are the most abundant. Other consolidated rocks in the county consist of limestone, dolomite, quartzite, granite, and gneiss. The average yield from wells in bedrock ranges from about 10 gpm (gallons per minute) for wells drawing water from quartzite, granite, and gneiss to 22 gpm for wells drawing from limestone.

Water from the Stockbridge limestone and the overlying unconsolidated deposits is hard and comparatively high in dissolved solids. Elsewhere, ground water is softer and lower in dissolved solids but is more likely to contain troublesome quantities of iron.

Ground water is the principal source of supply for farms, rural homes, and summer camps. It is also used for an increasing number of industrial and public supplies. The total use of ground water in the county in 1950 is estimated to have averaged about 7 million gallons a day. There are no known areas of appreciable size in which the supply is being depleted, and the overall supply is not only adequate for present requirements but is capable of supporting substantially larger demands.

GEOGRAPHY

Location and Setting

Dutchess County is in southeastern New York State, about halfway between New York City and Albany. It is one of a row of counties east of the Hudson River that border on the New England States. The county is bordered on the east by the State of Connecticut, on the south by Putnam County, on the west by the Hudson River, and on the north by Columbia County and the Commonwealth of Massachusetts.

Dutchess County is rectangular in outline and has an area of 816 square miles. It extends about 34 miles in a north-south direction and 22 miles in an east-west direction. Most of it lies between meridians $73^{\circ}30^{\circ}$ and $73^{\circ}59^{\circ}$ west longitude and parallels $41^{\circ}30^{\circ}$ and $42^{\circ}04^{\circ}$ north latitude. The population of the county in 1950 was 136,781, about 40 percent of which was concentrated in the cities of Poughkeepsie and Beacon.

Topography

The surface of Dutchess County is moderately irregular, consisting of an almost continous alternation of hills and valleys (pl. 1). Flat areas, though present in most parts of the county, are generally small and occupy a minor proportion of the area. The county is divided on the basis of topography into two relatively distinct parts. The smaller of these consists of the area in the northwestern part of the county west of Wappinger Creek and longitude 73 45 W. This area is characterized by numerous small, irregularly shaped hills, most of which range in height from about 20 to about 100 feet above the intervening valleys. Scattered throughout the area, however, are a few small, regularly shaped hills that rise 200 to 300 feet or more above the adjacent valleys. Altitudes in this area range from about 40 feet above sea level near the Hudson River to about 900 feet above sea level at 01d Round Top. Drainage is not so well developed as in the remainder of the county, as indicated by the presence of numerous swamps.

The remainder of the county—that is, east of longitude 73⁰45¹ W. in the northern part of the county and east and south of Wappinger Creek in the central and southern parts of the county—is characterized by numerous regularly shaped hills and low mountains. These are larger and generally higher than those in the northwestern part. Many of the hills in this area range in altitude from 500 to 1,000 feet above the floors of the valleys. The highest altitudes generally occur along the southern and eastern boundaries of the county. South Beacon Mountain, near the southwest corner of the county reaches an altitude of 1,602 feet above sea level. Brace Mountain, in the extreme northeast corner, reaches an altitude of 2,311 feet above sea level, the highest point in the county. South Beacon Mountain and the other mountains in the southern part of the county mark the northern limit of the Hudson Highlands, a belt of northeast—trending mountains under—

lain by resistant granite and gneiss. Brace Mountain and the other mountains along the eastern border of the county are a part of the Taconic Mountains (Fenneman, 1938, p. 1). Drainage is well developed in this area and swamps, though present, are not common.

Although hills and low mountains are the most characteristic topographic features of the eastern and southern parts of the county, the area includes several relatively extensive lowlands. The most prominent of these include the valley of Fishkill Creek, immediately north of the Hudson Highlands; the more or less continuous lowland, locally referred to as the Harlem Valley, near the eastern border of the county which includes the valleys of Swamp River, Tenmile River, and Webatuck Creek; and the area in the vicinity of Pine Plains near the northern boundary of the county. The otherwise flat surfaces of the lowlands are interrupted in many places by low hills 50 to 200 feet high. The flat surfaces of the lowlands range in altitude from about 400 to about 600 feet above sea level. The lowlands are underlain by limestone, and they owe their existence to the fact that the limestone is more susceptible to solution and other weathering processes than are the shale, quartzite, and crystalline rocks that underlie the remainder of the county.

<u>Drainage</u>

All of Dutchess County except the eastern part is in the Hudson River drainage basin (fig. 2). The Hudson River stands approximately at sea level and its stage rises and falls in response to ocean tides as far north as the locks of the barge canal at Troy, 50 miles north of the county. The largest streams in the county tributary to the Hudson are Wappinger Creek and Fishkill Creek. Wappinger Creek flows 32 miles across the county, from Pine Plains in the northeast to New Hamburg in the southwest. It has a total fall of 460 feet and an average fall of about 14 feet per mile. Fishkill Creek drains most of the central and southern parts of the county. It flows southwesterly from the vicinity of North Clove to the Hudson River at Beacon. It has a total fall of about 600 feet in 26 miles, or an average fall of about 23 feet per mile. Two of the major tributaries of the Hudson flow outside the county throughout most of their courses. Roeliff Jansen Kill, which drains a small area in the north-central part of the county, enters the Hudson River in Columbia County. The East Branch of the Croton River, which drains a small area in the southeastern part of Dutchess County, flows southward through Putnam County and southwestward into the Hudson River in Westchester County. Small areas are drained by Crum Elbow Creek, Landsman Kill, Stony Kill, and other small streams which generally flow southwestward into the Hudson River.

A small area of about 200 square miles in the eastern part of the county is drained by the Tenmile River, which flows eastward to the Housatonic River in Connecticut.

Consolidated Rocks

The bedrock underlying the county is composed of highly metamorphosed rocks of Precambrian age, and partially metamorphosed rocks of Paleozoic age. The older rocks, those of Precambrian age, consist mainly of granite and gneiss. The younger rocks, of Paleozoic age, consist of a larger variety and gneiss. The younger rocks, of Paleozoic age, consist of a larger variety of rock types, including quartzite, limestone, dolomite, marble, shale, of rock types, including quartzite, limestone, dolomite, marble, shale, of rock types, including quartzite, limestone, dolomite, marble, shale, of rock types, including quartzite, limestone, dolomite, marble, shale, of rock types, including quartzite, limestone, dolomite, marble, shale, of rock types, including quartzite, limestone, dolomite, marble, shale, of rock types, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist. Differences in age, degree of metamorphism, phyllite, slate, and schist, and s

Undifferentiated granite and gneiss.—Almost a tenth of Dutchess County is underlain at or near the surface by masses of northeast—trending igneous and metamorphic rocks of Precambrian age consisting chiefly of granite and gneiss. The largest mass underlies the southern part of the county from the Hudson River to the Connecticut State line. This mass ends abruptly 2 to 3 miles north of the southern border of the county against a series of submarallel major faults (pl. 2). Erosion of less resistant Paleozoic rocks parallel major faults has resulted in a row of granite and gneiss spurs which are prominent topographic features in the southern part of the county.

The second largest mass of granite and gneiss underlies the group of prominent hills east of Dover Plains. Smaller bodies of granite and gneiss crop out at Corbin Hill, north of Pawling; at Stissing Mountain, west of Pine Plains; northeast of Beacon; and south of Sprout Creek, a few miles southeast of Poughkeepsie (pl. 2). The elongate mass northeast of Beacon has been called the Matteawan granite (Mather, 1843, pl. 18) and the Glenham gneiss (Gordon, 1911, p. 18). In the southwestern part of the county, the granite was subdivided into the Canada Hill granite and Storm King granite by Berkey and Rice (1921). The gneiss, which contains some schist and lime-stone, was called "Grenville gneiss and schists" by Berkey and Rice. However, in an earlier study of the southwestern part of the county, Gordon (p. 11) grouped together all the granite and gneiss along the southwestern border of the county under the term "Precambrian gneisses."

Balk (1932 and 1936) mapped the same rocks in the eastern part of the county and made a detailed study of their structure. In his reports, and in a report by Barth (1936), the granite and gneiss were combined into one major group, undifferentiated Precambrian gneiss. Because these rocks have not been further subdivided in the eastern part of the county and because there appear to be no significant differences in their water-bearing properties, the granites and the gneisses are grouped together in this report as "undifferentiated granite and gneiss."

In physical appearance, most of the granite and gneiss consists of light and dark minerals presenting a speckled appearance (granite) or arranged in layers (gneiss). The light minerals consist chiefly of quartz, feldspar, and white mica (muscovite). The dark minerals include black mica (biotite), garnet, and hornblende. Extensive and readily accessible exposures of gneiss can be seen in road cuts along the Taconic State Parkway near the Putnam County line. These rocks are more resistant to weathering than the younger Paleozoic rocks, as is reflected by the more rugged topography and higher altitudes in areas where they crop out. Most of the layers (foliation) in the granite and gneiss strike northeast, approximately parallel to the long axis of the Hudson Highlands, and dip steeply to the southeast. Exceptions occur near thrust faults where the strike and dip of the foliation parallel the faults. Most of the large and prominent spurs underlain by granite and gneiss in the southern part of the county point northeastward, and the long axes of the smaller bodies also are alined in that direction.

Cheshire quartzite. -- A compact, strong quartzite, which is so tough that it is deliberately avoided by some drillers, crops out at a few localities in Dutchess County. This quartzite has been called the Poughquag quartzite by Berkey and some other geologists working in New York. It is called the Cheshire quartzite in this report, after its type locality at Cheshire, Berkshire County, Mass. (Emerson, 1917, p. 32-34). The quartzite unconformably overlies the Precambrian granite and gneiss and is the oldest Paleozoic rock in the county. In the southern and eastern parts of the county the quartzite forms the flanks of the higher ridges that are underlain by granite and gneiss. In the east-central part of the county, quartzite underlies several areas along the southern and western borders of the granite and gneiss in the vicinity of Dover Plains. Quartzite is present also in the southern part of Stissing Mountain in the north-central part of the county.

The Cheshire quartzite ranges in thickness from a few feet to about 600 feet. A thickness of about 250 feet has been reported at Stissing Mountain (Knopf, 1956, p. 11). The base of the formation may be conglomeratic and the top contains shaly beds in some places. In general, the quartzite is less strongly metamorphosed in the west than in the east. Some outcrops in the western part of the county still retain original sedimentary features, including bedding, crossbedding, and ripple marks. In the southeast, however, the original bedding has been destroyed by fracturing and recrystallization.

Where the Cheshire quartzite is composed almost entirely of quartz, it is white. Where small amounts of feldspar, mica, and other impurities are mixed with the quartz, it is pink or buff.

The Cheshire is not important as a source of ground water because of its small areal extent and because it underlies steeply sloping hillsides which are sparsely settled. Only five wells in the county are known to tap quartzite; these are listed in table 13.

Stockbridge limestone. -- Over the Cheshire quartzite is a thick sequence of carbonate rocks, which underlie a much greater part of the county than the quartzite. In the east, carbonate rocks lie beneath the broad Harlem Valley, which contains Tenmile River and its principal tributaries and which extends almost without interruption from the Putnam County line to the Columbia County line. In the south, the valley of Fishkill Creek is underlain by limestone which extends from Beacon northeastward to the head of the creek. Other areas in the western and central parts of the county also are underlain by elongate masses of carbonate rocks (pl. 2).

Several different names have been applied to the carbonate rocks in different parts of the county, including Barnegat limestone (Mather, 1843, p. 410), Fishkill limestone (Gordon, 1911, p. 70), and Wappinger limestone (Gordon, p. 48). Knopf (1956, p. 1817) found that the carbonate rocks near (Gordon, p. 48). Knopf (1956, p. 1817) found that the carbonate rocks near divided them into the Stissing dolomite, Pine Plains formation, Briarcliff, dolomite, Halcyon Lake formation, and Rochdale limestone. Because there appear to be no essential differences in the water-bearing properties of the carbonate rocks, all are included in this report under the Stockbridge limestone, after the locality in Massachusetts where they were first described (Emmons, 1842, p. 154-156).

The carbonate rocks range in composition from almost pure calcium carbonate (limestone) to almost pure calcium-magnesium carbonate (dolomite). Limestone is more abundant in the upper part of the sequence and dolomite is more common in the lower part. Table 3 lists an analysis of a typical sample of dolomite from the Stockbridge limestone.

This analysis shows that more than 10 percent of the dolomite consists of impurities, chiefly silica and alumina. In some localities these impurities are abundant enough to form sandy and shally beds in the Stockbridge.

Table 3.--Chemical composition of dolomite 1/ from the Stockbridge limestone

Determination	Percent by weight	
Lime (CaO)	29.07	
Magnesia (MgO)	16.29	
Carbonic acid (H ₂ CO ₃)	40.76	
Alumina (Al ₂ 0 ₃)	2.33	
Ferric oxide (Fe ₂ 0 ₃)	.47	
Silica (SiO ₂)	10.17	
Total	99.09	

Collected at the Stoneco quarry of the Clinton Point Stone Co. about 4 miles south of Poughkeepsie. Analysis from Ries (1901, p. 779).

The metamorphism of the Stockbridge limestone generally increases in intensity from northwest to southeast. In the northwest and west, the formation is relatively undisturbed and original bedding is easily visible. Fossils have been found in the formation as far south as Clove Valley. Farther east, however, as in the Valley of Swamp River, the formation has been metamorphosed to a marble and the beds are severely folded. Balk noted that the folding is greater in the thin layers than in the thicker ones and that it is greatest near thrust faults. In the southeastern part of the county, the marble has been so severely deformed by plastic flow that it appears to be wrapped around stronger rocks. South of Pawling, the marble contains masses of schist that are folded and faulted into the limestone.

The deformation of the Stockbridge limestone makes it difficult to determine its thickness. In southwestern Putnam County, where the formation is relatively undisturbed, the thickness is about 1,000 feet. At Stissing Mountain, near Pine Plains in the north-central part of Dutchess County, the thickness of the different limestones and dolomites measured by Knopf (1946, p. 1211) totals 2,800 feet. The thickness of the carbonate rocks is

probably about 1,000 feet in most places in the county. The Stockbridge limestone weathers readily and commonly forms valley and lowland areas. In the valley of Fishkill Creek, solution cavities filled with clay and sand have been reported.

Hudson River formation .-- The Hudson River formation is the most extensive bedrock unit in the county. As may be seen from plate 2, it extends from the Hudson River in the west to the Connecticut State line in the east, interrupted by only a few relatively narrow limestone belts. The name "Hudson River slate group" was first used by Mather (1840, p. 212, 256-258) for the slaty rocks in the southeastern part of the State. Gordon (1911) mapped these rocks in the Poughkeepsie quadrangle as the "Hudson River group." Berkey and Rice (1921) mapped the same rocks in southwestern Dutchess County as "Hudson River shales and phyllites." In the southeastern part of the county these rocks are referred to as "Hudson River pelite" in publications by Balk (1936) and Barth (1936). In the Copake quadrangle in southeastern Columbia County, the names Elizaville shale (mainly Cambrian, possibly including some Lower Ordovician), Berkshire schist (Ordovician), and Trenton black slate (Ordovician) have been used by Weaver (1957, pl. 1) for rocks that extend southward into northeastern Dutchess County. Ruedemann (1942) divided the predominantly argillaceous rocks in the Catskill quadrangle, in northwestern Dutchess County, into the Nassau beds and Schodack shale (including Bomoseen grit) of Cambrian age, and the Deepkill shale and Normanskill shale (including the Mount Merino member and the Austin Glen member) of Ordovician age. As used in this report, the Hudson River formation includes all the argillaceous and schistose rocks in Dutchess County.

Although the Hudson River formation is preponderantly argillaceous, it includes a large variety of rock types. The lower part of the unit contains much sandstone ("grit") and is locally called bluestone by some well drillers. The unit also contains chert and beds of sandstone, limestone, and conglomerate. Quartz veins are very abundant. The shale itself is locally black, gray, red, or green.

The metamorphism of the Hudson River formation increases in intensity from northwest to southeast, just as in the Stockbridge limestone. At Red Hook, in the northwestern part of the county, the unit is a shale. The shale grades imperceptibly southeastward into a slate and then into a lustrous phyllite. Between the valley of Wappinger Creek and the headwaters of Fishkill Creek, it is chiefly a phyllite. Farther southeast, between Fishkill Creek and the Harlem Valley it is predominantly a garnet-bearing schist. In the extreme southeastern part of the county, east of Pawling, it is a gneissic schist. The gneissic schist in this area contains amphibolite lenses and pegmatite intrusions.

The change in metamorphism is accompanied by a change in mineral composition. In the relatively unmetamorphosed phases of the formation in the northwestern and central parts of the county, the chief minerals are quartz and mica. In the strongly metamorphosed phase in the southeast, feldspar is an important additional constituent. Table 4 includes chemical analyses of rocks from various parts of the Hudson River formation, ranging from the relatively unmetamorphosed "slate" near Lagrangeville to the highly metamorphosed gneiss east of Pawling. There appear to be no radical chemical differences among the different samples. From the standpoint of mineral composition, however, the gneiss shows a greater percentage of feldspar (plagioclase) and a smaller percentage of white mica (muscovite) than does the slate and phyllite.

The structure of the Hudson River formation, like the mineral composition, changes progressively from northwest to southeast. In the relatively unmetamorphosed rocks between the valleys of Wappinger Creek and Fishkill Creek small closely spaced subparallel joints resulting from slaty cleavage are numerous. The spacing of these joints ranges from a fraction of an inch to several inches, and is wider in the more sandy parts of the formation. Openings of the bedding-plane type can be recognized in this area and to the northwest. In the southeastern part of the county, slaty cleavage is absent and the rocks are massive. Joints that are present are spaced from a few inches to several feet apart, rather than inches or fractions of an inch.

The thickness of the Hudson River formation is unknown because the beds in the southeast and east have been severely folded and faulted and because elsewhere individual beds can not be traced over long distances. The apparent thickness of the formation in Dutchess County ranges from a few feet to several thousand feet. Most wells of average depth drilled in this unit are not likely to penetrate other rocks unless they are drilled near the contact with the underlying limestone.

Table 4. -- Chemical and mineral composition, in percent by weight, of slate, phyllite, schist, and gneiss of the Hudson River formation

Chemical composition					
Constituent	Slate <u>l</u> /	Phylitte <u>2</u> /	Schist 3/	Gneiss 4/	
\$102	66.85	55.40	54.21	66.39	
TiO ₂	.56	.99	1.03	.74	
A1 ₂ 0 ₃	13.68	22.33	23.80	15.20	
Fe ₂ 0 ₃	1.79	1.30	1.42	2.41	
Fe0	3.92	6.82	6.95	3.96	
Mn0	.10	.14	.20	.15	
MgO	4.15	2.35	1.94	1.64	
Ca0	.10	.38	.36	1.83	
Na ₂ 0	2.08	1.02	1.34	3.48	
K ₂ 0	2.89	5.45	5.45 4.19		
P ₂ 0 ₅	.10	.20	.11	.16	
CO ₂	.18	<. 05			
H ₂ 0+	3.48	3.55	4.28	.88	
H ₂ 0-	.16	05	.04	.03	
C	••	Absent		••	
Total	100.04	100.03	99.87	99.60	

Table 4.--Chemical and mineral composition, in percent by weight, of slate, phyllite, schist, and gneiss of the Hudson River formation (Continued)

Mineral composition					
Mineral	Slate 1/	Phyllite <u>2</u> /	Schist 3/	Gneiss 4/	
Quartz	43.2	24.6	10.9	31.6	
Plagioclase	12.8		10.9	36.0	
Muscovite	33.0	40.8	46.4	11.3	
Biotite	••	24.0		18.3	
Apatite	.2	••	.3	.4	
'Hydroxides''	10.1		••		
Garnet		7.0	10.0	1.0	
Apatite+calcite		.5			
Magnetite				1.2	
Magnetite and ilmenite			3.9		
Chloride	••	- -	9.6		
Total	99.3	96.9	92.0	99.8	

Olive-gray slate collected 1.5 miles west of Lagrangeville. Plagioclase reported as albite. Analyst, A. Willman. (From Barth, 1936, p. 799.)

^{2/} Garnetiferous phyllite from Chestnut Ridge, west of Dover Plains.
Analysts, Ellestad and Barth. (From Barth, 1936, p. 802.)

Augen schist collected southwest of Dover Plains. Plagioclase reported as oligoclase (23 An.) "Rest" reported as Ca0= -0.5. Total reported as 100.0 although actual total is 92.0. Analyst, A. Willman. (From Barth, 1936, p. 804.)

Quartz-oligoclase-biotite gneiss 5 miles east of Pawling and about 1 to 1.5 miles east of Connecticut State line. Plagioclase reported as An 25. ''Rest'' reported as Al₂0₃ = -0.7, Fe₂0₃ = +1.2, Ca0 = -0.4, H₂0 = -0.4. Analyst, A. Willman. (From Barth, 1936, p. 812.)

Unconsolidated Deposits

Unconsolidated material deposited chiefly by glaciers and glacial melt water in Pleistocene time, lies on the bedrock in Dutchess County. Minor amounts of stream-laid material of Recent age mantle the Pleistocene deposits in a few narrow, discontinuous valley areas and in some lakes and swamps. The unconsolidated deposits are widespread and relatively thick, at least in lowland areas. The greatest thickness occurs in the gorge of the Hudson River, where borings for the Catskill Aqueduct of New York City penetrated several hundred feet of fill, most of which is probably of glacial origin. The deepest boring was at the Storm King crossing, near the Putnam County line, where bedrock reportedly was encountered at a depth of 608 feet below river level. If this reported depth is correct, the deepest part of the bedrock gorge probably is somewhat below 608 feet because it is unlikely that the drill was situated at exactly the deepest point. The layers penetrated by these borings ranged in composition from a mixture of clay and boulders to sand and gravel.

The Pleistocene drift is divided into three units, shown on plate 3: (1) till (unstratified drift), consisting of a mixture of rock materials deposited directly by the ice; (2) lacustrine deposits, consisting of silt and clay laid down in lakes; and (3) sand and gravel deposited in lowlands and in lakes from glacial melt water.

Till.--Till consists of a heterogeneous mixture of rock fragments of all sizes from microscopic particles of clay to large boulders several feet in diameter. As may be seen on plate 3, it is the most widespread of the Pleistocene deposits.

The till was laid down directly from the glacial ice, which was thick enough to pass over the highest peaks in the county, as well as the highest peaks of the Catskill and Taconic Mountains. The ice moved in a southerly direction, as indicated by the alinement of grooves and striations on exposed rock surfaces. Erosion was the dominant process in upland areas. Thus, the present-day cover of glacial debris in these areas is generally thin (less than 30 feet thick) or absent. Exceptions exist where thick deposits of till were laid down beneath the ice in the form of elliptical hills known as drumlins. These hills may contain as much as 200 feet of clay till. In lowland areas, the dominant process was that of deposition and the glacial deposits in these areas are relatively thick. For example, well Du 758, about 2 miles southwest of Wappingers Falls, penetrated 140 feet of unconsolidated material before reaching the Hudson River formation.

The rock fragments composing the till were derived mainly from the bedrock in the immediate area. In areas underlain by shale, slate, phyllite, and schist, the till consists largely of clay. In areas underlain by limestone, dolomite, or marble, the till contains numerous calcareous pebbles. Six mechanical analyses were made by the U.S. Department of Agriculture (Secor and others, 1955, p. 128) of samples of soil in the county

derived from glacial till. These samples consisted mainly of calcareous sandstone and some admixed shale, slate, limestone, and igneous erratics. The samples were collected from progressively greater depths. The analyses show that more than half of each sample consisted of silt and clay, and that the content of sand and fine gravel increased slightly from a low of 36.3 percent (by weight), at a depth of 0 to 10 inches, to a high of 43.0 percent, at a depth of 68 to 144 inches. In some areas, lenses of relatively clean sand may occur in till. However, sand lenses in till are generally thin and of small areal extent. Most of the till is clayey and some of it may even be cemented or compacted to form a tough aggregate referred to as "hardpan" by local drillers.

Lacustrine deposits. -- Stratified drift deposited in glacial lakes underlies several areas in the county, notably along the Hudson River and in the lowland north of the Hudson Highlands in the southwestern part of the county. The approximate extent of these deposits where they compose the uppermost unconsolidated deposit is shown on plate 3. As may be seen from the plate, they underlie an irregularly shaped and relatively extensive area in the northwestern corner of the county, from the mouth of Crum Elbow Creek north to the county line. In the southwestern part of the county, they underlie numerous small areas from Poughkeepsie south to the Highlands.

Woodworth (1905, p. 175) believed that the lacustrine deposits along the Hudson River were laid down in one large lake, called glacial Lake Albany, which was dammed by a single tongue of stagnant ice. Cook (1942, p. 192) suggests, on the other hand, that the deposits were laid down in a complex series of small lakes rather than in a single lake. These lakes were largely restricted to the area adjacent to the Hudson River in the western part of the county. Thus, lacustrine deposits either are not present in the eastern part of the county or, if present, occupy relatively small areas and are covered by other unconsolidated deposits which obscure their presence.

The lacustrine deposits in the western part of the county contain layers of silt and clay that were deposited in those parts of the lakes in which the water was relatively quiet. The deposits also contain interbedded layers of sand and silt that were laid down near the mouths of streams entering the lakes. At the time the lakes drained, the lacustrine deposits formed a terrace that sloped westward toward the present channel of the Hudson River. The altitude of the terrace ranges from about 220 feet near its eastern margin to about 120 feet near the river. This terrace has been considerably modified by postglacial stream erosion.

<u>Sand and gravel.</u>--Stratified drift consisting principally of sand and gravel underlies extensive areas in the major stream valleys and in some tributary valleys. As shown in plate 3, the most extensive deposits are in the valleys drained by Fishkill Creek, Sprout Creek, Swamp River, Tenmile River, and Wappinger Creek.

Most of the sand and gravel consists of stream-laid deposits, called outwash, laid down by melt water streams. The deposits range from layers of relatively clean sand to layers composed of a mixture of sand and gravel. The alternation of layers of coarse and fine material reflect changes in the conditions under which the beds were laid down.

Stratified sand and gravel in the county occurs in four principal forms: kames, kame terraces, valley trains, and deltas. Kames, in the form of small conical hills, are relatively common in the extreme southern part of the county at the northern margin of the Hudson Highlands. They are present also between the Hudson River and U.S. Highway 9, about 3 miles south of Poughkeepsie. Kame terraces, relatively flat topped deposits of sand and gravel on the sides of valleys are prominent in the valley of Swamp River. They have also been observed by Woodworth (1905, p. 121) along the Hudson River between Poughkeepsie and the mouth of Wappinger Creek. Valley-train deposits are long and narrow deposits of sand and gravel underlying valley floors. These deposits underlie parts of many of the principal stream valleys, including those of Wappinger Creek, Fishkill Creek, Webatuck Creek, Crum Elbow Creek, and Tenmile River (pl. 3). Delta deposits laid down where melt water streams entered glacial lakes, have been mapped at New Hamburg, at the mouth of Wappinger Creek, by Woodworth (p. 119) and have been observed also in the Valley of Swamp River. There are large deltas also at Rhinebeck and Red Hook. of sand and gravel in the principal stream valleys of the county are discussed in greater detail in the section devoted to the occurrence of water in unconsolidated deposits.

GROUND WATER

Source and Movement

Ground water occurs in all the consolidated and unconsolidated deposits of Dutchess County. Records of 675 wells (table 13) and about 50 springs (table 9) provide information on its occurrence in the different deposits.

Practically all ground water in the county is derived from local precipitation. An inch of rain, or snow having a water content equivalent to 1 inch of rain, falling on an area of 1 square mile yields about 17 million gallons of water. The average annual precipitation is about 45 inches, or about 1.6 billion gallons per day, on the 816 square miles of the county.

A large part of the precipitation returns to the atmosphere by evaporation, is transpired by vegetation, or runs off to streams. The remainder percolates into the ground. The amount of precipitation entering the ground depends chiefly on (1) the porosity, permeability, and water content of the surficial deposits, (2) the slope of the land, (3) the amount and kind of vegetal cover, and (4) the intensity and amount of precipitation. It is

Table 8. -- Yield of wells in bedrock in relation to topography

Type of bedrock		Yield (gpm)			
	Topography	Average	Range		Number
			Low	High	of wells
Hudson River formation	Hill top Hillside Valley	14 16 17	0 0.5 2	40 120 135	30 168 116
Stockbridge limestone	Hilltop Hillside Valley	10 17 26	1 3 1	20 80 220	7 45 71
Undifferentiated granite and gneiss	Hilltop Hillside Valley	4 11 13	3 1 7	5 45 30	2 15 5
All bedrock combined	Hilltop Hillside Valley All locations combined	1/12 1/16 1/20 1/17	0 0.5 1 0	40 120 220 220	39 228 192 459

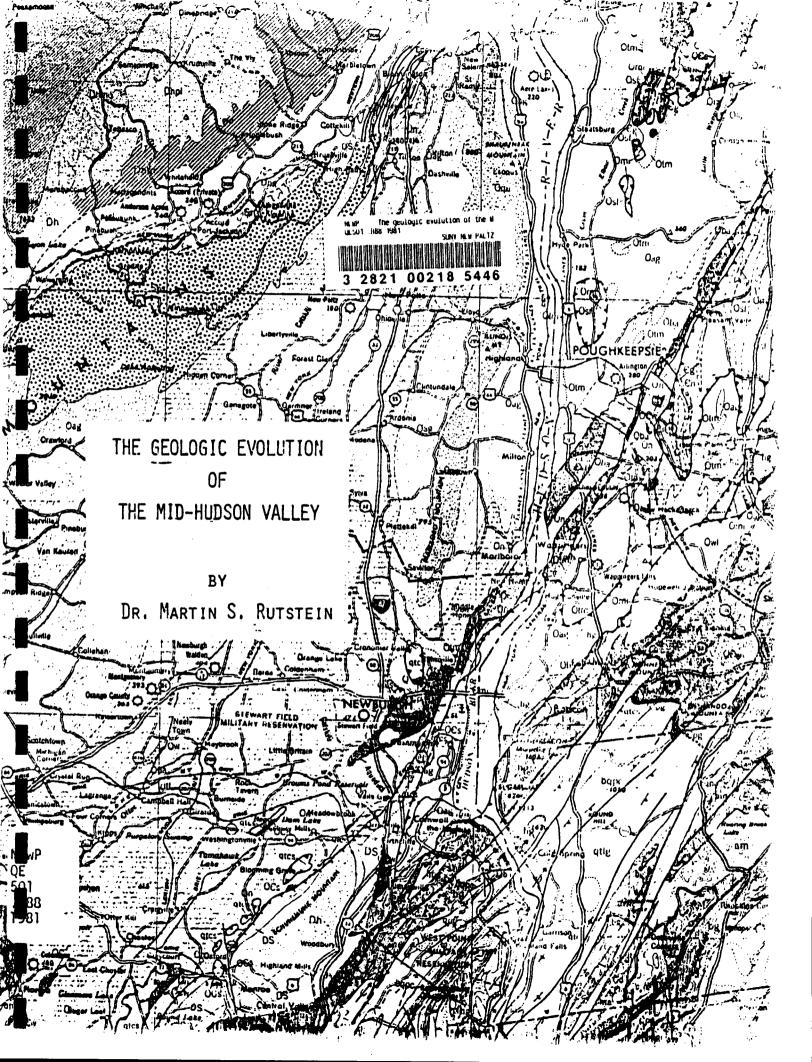
Weighted average. .

Well number	Location	71	Omer Or Occupant	Altitude above see level (feet)	Type of mil	Depth below land surface (feet)	Di ameter (Inches)	Dopth to bedrock (feet)	Veter-bearing	Voter level below land surface (feet)	Method of 11ft	Vield (gettone per	Use	
Ov 56	137, 2.0H, I	₩.	J. Cumningham	600	Orl	75	6	2	Hudson River forestion	10	Suction	<u>elmite)</u>	000	Mald 3
№ 57	137, 1.38, 1	. IW	George Degenherdt	660	Dri	104	6	20	40,	18				Vield 2 gps when well was h0 ft deep.
0 58	137, 1,3N, 0), 2V	S. Rollins	380	Orl	150	6	25	do,	20	Suction	,	fore	Viold 2 gpm when wall was 20 ft deep, (a),
De 59	137, 0.15, 7		Mrs, Coholian	240	Dri	80	6		do,	30	-	Š	-	
Pu 60	137, 0.75, 6	.8⊌	Delrymen's League Co-op. Assn. Inc.	220	Drŧ	180	8		do.	40	Turbina	60	Com	Average consumption is 12,000 gpd.
Op 61	157, 14.20, 1	. 94	Clifford Porter	420	Dug		96	7	Pleistacene till	2	Suction		Farm	Temperature 55°F, New 1949,
D= 62	157, 6.20, 0	, IV	A. HcGregor	300	Dŕl	1,00	6	14	Stockbridge Himestone	22	Force		fore	
№ 63	14Y, 10,75, 8	.8£	Williston Hanufacturing Corp.	470	Del	200	6	14	do,	••	do.		Ind	Standby unit; spring the 385p is principal source of supply. (a).
Pu 64	147, 12.50, 7.	, IV	Milnebeck Water Co.	260	0+1	300	•		Hudson River formation	19	Turbino	135	PS	(a) (b).
Du 65	147, 12.40, 7.	, IW	do.	260	Orl	300			de.		do.	65	PS	19, 197.
Po 66	167, 13.7H, 8.	, 5 V	VIII Fam HotherIngton	160	Ort	192	•	15	do.	+5	***	70	Dom	Yield 6.5 gpm when well were 170 ft dood.
Du 67	14Y, 14.2H, 8.	.ov	L, B. Berber -	160	Ori	60	6	10	do.	30	force	,	Don	11010 0.5 gpm men out 1 to 12 deep.
№ .68	157, 10,1H, 9.	. IV	A. W. Springer	140	Dri	120	6	42	Stackbridge limestone	••			Dan	
Du 69	157, 15.50, 8.	, iw	fairview improvement Co.	380	Dri	250	6	20	Hudson Alver formation	24	**	12	Dam .	(6).
0 ₩ 70	15Y, 14.0H, 6.	₩.	Aertsen Yen Wogenen	200	Ort	113	6	38	40.	••		•	9am	Viold 0.5 gpm when well was 60 ft deep.
Du 79	147, 7.20, 6.	2W '	Steetsburg Water Co.	240	Orl	305	10 to 8	22	do.	16	Turbino	120	PS	(6).
№ 73	147, 6.85, 10.	įE	School District No. 8	500	Orl	97	6	45	Stackbridge Himestane	12		6	lon.	
№ 74	14V, 13.2N, 6.		Crow Hill Form Comp	280	Drl	125	6	12	Hudson River formation	12		ts	Cam	Grandom 28 ft after pumping 15 gam for 5 hrs.
Ou 75	147, 15.2H, 7.		Sunset Rest	200	Drl	147	6	24	do.	10		10	Com	Prinidam 32 ft after pumping 10 gam for 5 hrs.
Du 76	137, 0.45, 4.		Shekameko Velley Ferm	400	0/1	435	10 to 8	68	do.	22		•	Form	Well hee been purped at 9 gpm for 8 hrs.
Du 77	15Y, 12.5N, 6.		Henry Slage1	200	Ort	150	6	57	Stockbridge Haustone			15	Don	(b).
0w 78	15Y, 10.6H, 9.		International Business Machines Corp.	100	Orl	400	6	34	40.	••		40	lad	Well has been pumped at 40 gpm for 9.5 hrs. (b).
Ou 79	137, 7.55, 4,		John Festert	700	Drl	145	6	53	Hudson Alver formetion	20		15	Dom	Drawdom 105 ft efter pumping 15 gam for 2 hrs.
Du 80	137, 6.25, 1,		Camp Laurel	600	Orl	200	44	**	do.		••	12	Com	
P= 81	137, 3.78, 9.		Silver Acre Fore	1.,180	Drl	164	6	13	ض.	25		6	Form	Orandom about 140 ft after pumping 6 gpm for 1 hr.
0√ 83	144, 15.85, 5.		Interchurch Camp Society, Inc.	740	Drl	52	8 to 6	22	Granite and gneiss, undiff.	18		•	lon	Brandom 30 ft ofter pumping 8 gam for 6 hrs.
Du 83	147, 16.0M. 2.		Ephroim Fainstala	520	Orl	115	-6	3	Hudson River formation	15		18 () One	Drawdown 65 ft efter pumping 18 gpm for 7 hrs. (b).
Du 84	15V, 7.5N; 0.5	94	Village of Wappingers Falts	150	Dri	80 (16 to 8		Plaistocene send <u>and</u> gravel		Con- tri fugal	160 (*	Average pumpage from wells to the and to 85 is about 120,000 gpd. (a).
D- 85	157, 7,50, 8.		do.	150	Orl	80 (16 to 8		do.	••	do.	150 (3	Temperature 51°F, October 1969.
Pu 86	144, 6.75, 3.		R; McKinney	480	Dug	16	30		do,	11 1	Hone	1	lone	Temperature 53°7, June 1969.
Du 87	13Y, 4.4H, 7.		Village of Tival)		Orl	36	6	36	de.	13		30 I	*	Brandom 17 ft after pumping 20 gam for 10 krs. Well originally drilled & ft into bedrock; screened between depths of 30 and 36 ft. Rue other similar wells at this location, (a) (b).
	13V, 15.25, 10.		Massalc, State School		Dr 1	1007	8		· do,	5		#	one	Mall finished with screen. Abandoned because of a decreese in yield. (a) (b).
Du 91			Familing Girl Scout Comp		0+1	255	6	17	ludson filver formation	6	••	5 0		Drawdown 119 ft after pumping 5 gpm for 2 hrs.
Du 92	14V. 6.8M. Q.	9W .	New York State Dept. of	482	Drl	199	6	43 1	tockbridge limestone	1	let	15 0	-	- · · · · · · · · · · · · · · · · · · ·

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REFERENCE 11

ر تاريخ.



Stuyvesant Falls Formation - Generally The Stuyvesant Falls (100-350m) is a light green shale containing interbeds of dolostone, clastics, and chert. Occasionally, graptolites are found in some shaley seams and denote an Early Ordovician age for this distal slope and oceanic basin deposit (Fisher and Warthin 1977).

Normanskill Group - The Normanskill consists of The Indian River Shale, The Mount Merino Shale, and The Austin Glen Graywacke (Fisher and Warthin, 1977). These units are allochthonous and are believed to be Middle Ordovician. That is, they were deposited in deep water in the time just preceding the onset of sedimentation into the Snake Hill trough.

Indian River Shale - This unit (30-350m) is an easily recognizable deep red radiolaria-bearing shale which contains occasional lenses of gray-green shale. The original sediments may be the remains of a terra-rosa soil developed on the sub-Trenton Black River unconformity of Middle Ordovician age (Bird and Dewey, 1975). However, it grades into the overlying Mt. Merino which contains pre-Balmville graptolites. Thus, if a terra rosa sediment, then it ought to have formed early in the Middle Ordovician block faulting and weathering cycle.

On the other hand, it is possible that the coloration is a result of oxidation and/or reduction of iron silicates and oxides by percolating ground waters. Assuming, in the absence of other data, that Bird and Dewey are correct, then these deeply weathered soils were then quickly transported and deposited into deep oceanic waters in the eastern side of the miogeosynclinal basin and subsequently transported to the west by submarine gravity sliding of blocks and slices.

The lower contact of the Indian River is a fault surface along which low angle thrusting has occurred. It is of variable thickness since slices of differing thickness were transported to various sites. The upper contact is gradational into the darker colored shales and cherts of the Mt. Merino Formation.

Mt. Merino Shale - Darker colored than the Indian River Formation the radiolaria-bearing shale facies of this unit is predominantly green and black. Especially well-developed are the black, fine-grained cherts which characterize this formation. Bird and Lang (unpublished), on the basis of petrographic studies, believe that these cherts are volcanogenic in origin. Thus, they must be correlative with the Ammonoosuc volcanic belt to the east and probably represent an oceanic basin deposit which is equivalent in time to this Middle Ordovician volcanic event.

Austin Glen Graywacke - Although formerly confused with various facies of The Middle Ordovician trough sequence, it now appears best to assign this 300m thick unit to the Normanskill Group, thus making it pre-Middle Ordovician (Fisher and Warthin, 1977). Lower pertions of the sequence are thin-bedded graywackes and calstics interbedded with much argillite. Upper sequences are

CHAPTER VIII

LATE MESOZOIC TO RECENT

CENERAL

The Cietaceous Period was characterized by a gentle tilting of coastal plain regions and a gradual marine transgression.

Legionally, this onlap occurred all along the eastern seaboard.

Locally the marine invasion may have extended to just south of the Hudson Highlands. Subsequent erosion removed any sediments which might have formed in this area. The closest remaining trata are found in northwestern Long Island where stream deposits which formed in swampy lowlands and coastal estuaries are observed. These are locally quite fossiliferous with flora accumulations ocally forming lignite deposits.

CRETACEOUS PERIOD

approximately 70 m.y. ago, the Coastal Plain was tilted. Subsequently the ocean transgressed these unconsolidated sediments (e.g. Magothy along Long Island Sound). As mentioned above, marine and coastal patterns of sedimentation might have extended to the Highlands. However, with subsequent, recent erosion, no traces of these possible sediments have been found in the Mid-Iudson Valley.

QUARTERNARY PERIOD

During the past one million years, the Earth underwent ten major ice ages. The last began 100,000 years ago and had many cold/warm pscillations. Thus, for much of the time during the Pleistocene [Wisconsian] Epoch, the Mid-Hudson Valley was covered by an ice sheet which was close to 2-3 km thick. Glacier movement was generally from northeast to southwest, reflecting the physiographic control imposed by the Shawangunk Mountain ridges. The generally elliptical morphologies of bedrock in the region reflects this shaping movement.

About 15,000 years ago, during the Holocene or Recent Epoch, the climate began to warm and the glacier retreated intermittantly. Eventually, melt waters filled the Wallkill Valley to a depth of 175 m. Deposits represented by the glacial event are till, stratified drift and proglacial lake sediments (Connally and Sirkin, 1968).

Till - Generally this unstratified drift is a light- to dark-gray material commonly containing sandstone and graywacke pebbles in a loam to clay-loam matrix.

Stratified Drift - Stratified drift is characteristic of features such as kames, eskers, or outwash plains. In this area, it is generally a shale gravel.

REFERENCE 12

SOIL SURVEY

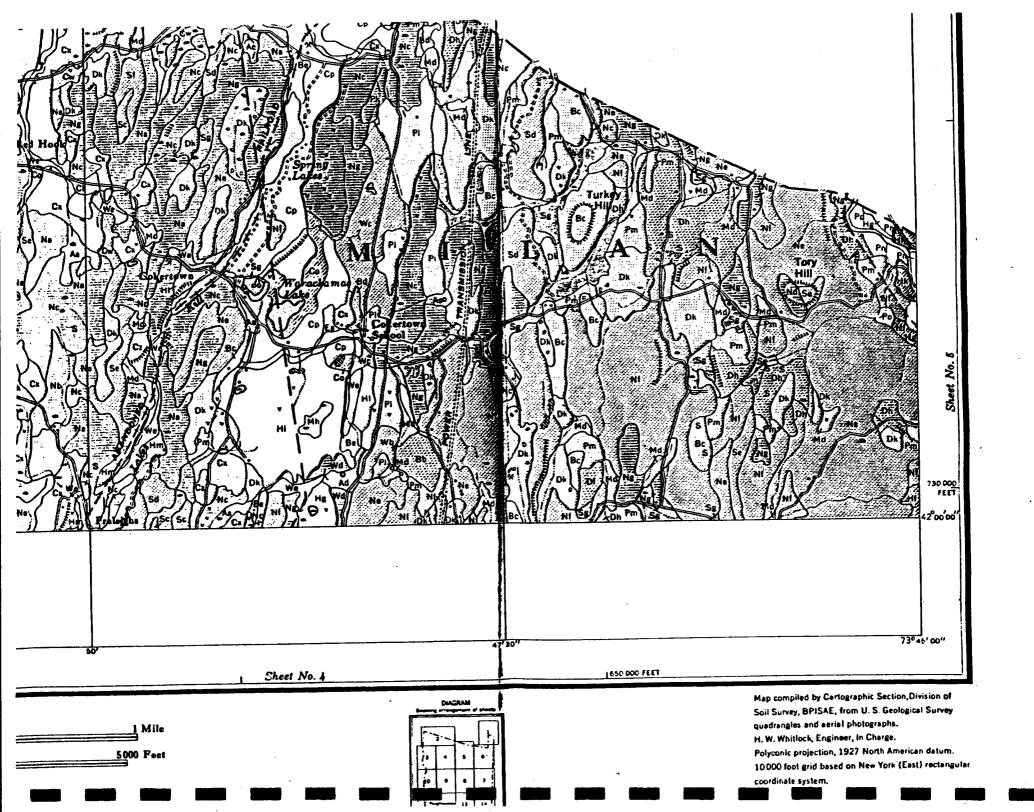
Dutchess County New York



Series 1939, No. 23

Issued December 1955

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION



REFERENCE 13

OPERATION OF WASTEWATER TREATMENT PLANTS

MANUAL OF PRACTICE NO. 11

WATER POLLUTION CONTROL FEDERATION

expressing the acid ion concentration) he pH scale ranges ately 14, with a pH the acid range and nge. pH 7 is defined

l of the wastewater rator when determin-It is important that becomes thoroughly neasurement and its as a process control

neasure of a wasteneutralize. The bie, and hydroxide ions ontributors to alkaorates, silicates, and so contribute.

n of alkalinity levels in a plant will be an inderstanding and interest ment process. For all addition is used to water for solids reports may be released decrease. Alkalinity ralize ("buffer") the permit coagulation to oper pH range. Some it processes are disinand sludge prepara-

ons of various forms ful in the control of a ent plant. TS, SS, and lattle and fixed fracto assess wastewater efficiency, and unit ments of the various tions are necessary to are satisfactory operatinportant that the optificient knowledge of the sand their interpre-

tation so that they become routine daily procedures.

Total solids, TS, is a term applied to the weight of material per unit volume of sample remaining in a previously weighed crucible after evaporation of the sample at a temperature of 103° to 105°C. TS is equivalent to the sum of filterable residue (the portion of TS that would have been retained if the sample were filtered before evaporation) and nonfilterable residue. In wastewater work, the term "suspended solids" is taken to correspond to filterable residue. The term "dissolved solids" is taken to correspond to the nonfilterable residue.

TS, DS, and SS may be further categorized as volatile or fixed (nonvolatile). VS are more or less equivalent to the fraction of residue that is organic, while nonvolatile solids approximate the inorganic fraction present. These fractions are differentiated by firing either the filter or evaporating dish as required at 550°C for 1h. Typical solids contents of domestic wastewaters are given in Table 3-I.

TABLE 3-I. Typical Solids Contents in Domestic Wastewater

Solids Classification	Concentration (mg/l)					
	Strong	Medium	Weak			
TS						
Total	1,200	700	350			
Fixed	600	350	175			
Volatile	600	350	175			
SS		İ	ł			
Total	350*	200	100			
Fixed	75	50	30			
Volutile	275	150	70			
DS			1			
Total	850	500	250			
Fixed	525	300	145			
Volatile	325	200	105			

^{*} Somewhat higher in the United Kingdom.

Because solids determinations are empirical in nature, a consistent procedure should always be used and the procedure stated in the presentation of results.

Biochemical Oxygen Demand (BOD)

The BODs of a wastewater is widely used as an indicator of the fraction of

organic matter that may be degraded by microbial action in a given time period at a temperature of 20°C. It may be considered a measure of pollutional strength of the wastes in that the test is related to the oxygen that would be required to stabilize the waste after discharge to a receiving body of water. The BODs test has been used widely by regulatory agencies to gauge overall treatment plant efficiencies. The BODs of domestic wastewater plant influent in the U.S. typically ranges from 100 to 300 mg/l (in the U.K., values would be somewhat higher).

Chemical Oxygen Demand (COD)

COD is another means of measuring the pollutional strength of a wastewater. By using this method, most oxidizable organic compounds present in the wastewater sample may be measured. Generally, COD values will be higher than those determined with the BOD test. The reason for this difference is that the BODs test measures only the quantity of organic material capable of being oxidized by microbial action, while the COD test represents a more complete oxidation.

The COD test has a major advantage over the BOD analysis because of the short time required for performance—a few hours as opposed to 5 days for the standard BOD test. This advantage permits closer operational control of the treatment process. Typical COD values for a domestic waste range from 200 to 500 mg/l. As the industrial content of the wastewater increases, COD values may be 2 to 5 times [or higher] BODs values.

Total Organic Carbon (TOC)

The need for rapid determinations of wastewater strength has led to the development of organic carbon analyzers and their introduction in some treatment plant laboratories. All of the available instruments measure the organic carbon content of aqueous samples, although there are several methods by which this

REFERENCE 14

THE SOIL CHEMISTRY OF HAZARDOUS MATERIALS

James Dragun, Ph.D.



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natural environmental conditions.

Relatively little is known about the first two types of soil mineral fixation reactions discussed above. However, these are not considered to be extensively occurring reactions. On the other hand, the fixation of elements via incorporation into the structure of soil minerals during mineral precipitation is an extremely important reaction. This chapter will focus on the types and amounts of elements found in soil, how these elements are fixed into mineral structures, and how some remedial actions have utilized element fixation.

ELEMENT CONCENTRATIONS IN SOIL

Eleven of the elements listed in Table 3.1, along with carbon, hydrogen, and oxygen, constitute over 99 percent of the total elemental content of soil: Al, Ca, Fe, K, Mg, Mn, Na, P, S, Si, and Ti. The remaining one percent is comprised of elements known commonly as the "trace elements." The word "trace" identifies the fact that they occur in soil in minute amounts; it has no bearing or relationship to any concentration limit protecting human health or biota.

Table 3.1 lists the mean concentrations, typical ranges, and observed limits of several elements in natural soil (i.e. background concentrations). The total concentration of any element, C_{Total} , in a soil is equal to:

$$C_{Total} = C_{Fixed} + C_{Adsorbed} + C_{Water}$$
 (3.1)

where:

C_{Fixed} = concentration of fixed element comprising part of the structure of clay and soil minerals, in mg element/kg soil.

C_{Adsorbed} = concentration of element adsorbed onto the surface of soil minerals and onto organic matter exchange sites, in mg element/kg soil.

C_{water} = concentration of element in soil water or groundwater in equilibrium with C_{Adsorbed}, in mg soluble element/kg soil. (See Table 3.2 for natural background levels found in groundwater).

 C_{Fixed} represents the "immobile" fraction of C_{Total} . The sum of C_{Adsorbed} and C_{water} represents the potentially mobile portion of C_{Total} ; these will be discussed in detail in the next chapter.

There are four important facts that should be understood concerning the data listed in Table 3.1, the parameters listed in Equation 3.1, and the interrelationships of these parameters. First, C_{Total} should not be expected to be uniform with depth. Natural processes involved in the distribution of elements in the soil profile include:

TABLE 3.1 Native Soil Concentrations of Various Flement

	Native Soil Concentrations of Various Elements					
	Concentral	tion (ppm)				
Element	Typical Range	Extreme Limits				
Ag	0.1 - 5.0	0.1 - 50				
Al	10,000 - 300,000	***				
As	1.0 - 40	0.1 - 500				
В	2.0 - 130	0.1 - 3000				
Ba	100 - 3500	10 - 10,000				
Be	0.1 - 40	0.1 - 100				
Br	1.0 - 10	 .				
Ca	100 - 400,000	-				
Cd	0.01 - 7.0	0.01 - 45				
Ce	30 - 50	-				
CI	10 - 100					
Co	1.0 - 40	0.01 - 500				
Cr	5.0 - 3000	0.5 - 10,000				
Cs C:	0.3 - 25	_				
Cn	2.0 - 100	0.1 - 14,000				
F	30 - 300	-				
Fe	7,050 - 550,000					
Ga	0.4 - 300	-				
Ge	1.0 - 50	-				
Hg	0.01 - 0.08	_				
1	0.1 - 40	-				
K	400 - 30,000	-				
La	1.0 - 5000					
Li	7.0 - 200	1.0 - 3000				
Mg	600 - 6000					
Mn	100 - 4000	1.0 - 70,000				
Мо	0.2 - 5.0	0.1 - 400				
Na	750 - 7500	400 - 30,000				
Ni	5.0 - 1000	0.8 - 6200				
P	50 - 5000	-				
Pb	2.0 - 200	0.1 - 3000				
Ra	10-6.5 - 10-5.7	<u> </u>				
Rb	20 - 600	3.0 - 3000				
S	30 - 10,000	_				
Sp	0.6 - 10	_				
Sc	10 - 25	—				
Se	0.1 - 2.0	0.01 - 400				
Si	230,000 - 350,000					
Sn	2.0 - 200	0.1 - 700				
Sr 	50 - 1000	10 - 5000				
Th	0.1 - 12	-				
Ti	1000 - 10,000	400 - > 10,000				
U	0.9 - 9.0	< 250				
V	20 - 500	1.0 - 1000				
Y	10 - 500					
Zn	10 - 300	3.0 - 10,000				
Zr	60 - 2000	10 - 8000				

Based on an Analysis of Data Presented in References 1,2,3.4.5 and 6

- Leaching of mobilized elements such as calcium, boron, lithium, iron, magnesium, manganese, selenium, or sodium (a) out of the soil profile, or
 (b) into zones of accumulation.
- Translocation, in the course of soil-forming processes such as podzolization, of trace elements together with iron and aluminum.
- Mobilization of trace elements through breakdown of soil minerals as a result of alternate wetting and drying.
- Mechanical translocation of clay, which increases trace element concentrations in those soil horizons having higher amounts of clay particles.
- Surface accumulation of relatively soluble elements such as boron, calcium, and sodium in arid regions.
- Mobilization or fixation arising from chemical and/or microbiological activity.
- Surface enrichment due to trace element uptake by plants.

Second, analytical data derived from the chemical analysis of the total element content of a soil (i.e. C_{Total}) relays no information regarding C_{Fasel} , $C_{Adsorbed}$, and C_{water} other than the magnitude of their combined concentrations. In other words, if a laboratory report states that a soil contains 125 ppm total Cu, this datum cannot reveal if 0.1 percent is potentially mobile (i.e. $C_{Adsorbed} + C_{water}$) or if 99 percent is potentially mobile. At background concentrations, the relative magnitudes of the parameters listed in Equation 3.1 for cations generally are:

$C_{\rm Fixed} >> C_{\rm Advorbed} > C_{\rm Water}$

The greater part of C_{Total} exists as C_{Flued} and is immobile. However, this relative ranking may or may not change as C_{Total} increases above the background concentration.

Third, the background concentrations listed in Table 3.1 represent the total concentration of an element present after the soil was formed and weathered. This concentration gives no information on the element-loading capacity of a soil. The element-loading capacity can be defined as the maximum amount of an element that can be added to soil which does not cause water migrating through this soil to contain a harmful concentration of that element. In other words, knowing that a soil contains 125 ppm total background Cu will not reveal if soil will or will not completely convert an additional loading of 500 ppm Cu into C_{Fined}.

Soil cleanup standards that specify the excavation or treatment of soil containing concentrations of an element over a background concentration are usually based on an incorrect premise that the background concentration of an element in soil represents a maximum concentration of an element which the soil can immobilize. The background concentration represents the total concentration present after the soil was formed and undergone some degree

	Consentration					
Element	Typical Value	Extreme Value				
	Major Elements (ppm)					
Ca	1.0 - 1500					
	< 5004	95,000				
CI	1.0 - 706	300 000-				
	< 1000⁴	200,000				
F	0.1 - 5.0	70				
		1600				
Fe	0.01 - 10	> 1000-				
K	1.0 + 10	25,000¢				
Mg	1.0 - 506	52,000s				
	< 4004					
Na '	0.5 - 1·20b	120,000				
- 4 -	< 10004	·				
NO ₃	0.2 - 20	70				
SiO ₂	5.0 - 100	4,000				
SO ₄	3.0 - 150b	200,000				
	< 20004					
Sr	0.1 - 4.0	50				
<u> </u>	Trace Eleme	ents (ppb)				
.Ag	< 5.0					
Al	< 5.0 - 1000					
As	< 1.0 - 30	4,000				
B Ba	20 - 1000	5,000				
Br	10 - 500					
Be	< 100 - 2000					
Bi	< 10					
Cq Di	< 20					
Co	< 1.0					
Cī	< 10					
Cu	< 1.0 - 5.0 < 1.0 - 30					
Ga	< 2.0					
Ge	< 20 - 50					
Hg	< 1.0					
j	< 1.0 - 1000	45 0004				
Li	1:0 - 1:50	48,000¢				
Mn	< 1.0 - 1000	10,000				
Mo	< 1.0 - 30	-				
Ni	< 10 - 50	10,000				
PO ₄	< 100 - 1000					
Pb	< 15					
Ra	< 0.1 - 4.0f	720s. f				
RЬ	< 1.0	720 1				
Se	< 1.0 - 10					
Sn	< 200					
Ti	< 1.0 - 150	-				
U	0.1 - 40					
V	< 1.0 - 10	70				
Zn	< 10 - 2000					
Zr	< 25					

^{*} based on an analysis of data presented in references 7,8, and 9.

b in relatively humid regions.

e in brine.

d in relatively dry regions.

^{*} in thermal springs and mine areas.

f picocuries/liter (i.e. 0 037 disintegrations/sec).

REFERENCE 15

Hawley'S ISE

Revised by Revised J. Lewis, St. Richard J. Lewis, St. Richard J. Lewis, St.

uct of 1% aluca, used in cecle sizes.

nzothiazole r accelerator.

ulfate. alumisulfate.

(SO₄)₂.
luminum po-

e.

weetish taste. ir. Soluble in ld water, in-

ium sulfate.

ium ammo-

of approxirefully conn, and man-

d lead wire.

article size:
plus 5 miy, pH 4.5-

lowing en-

rential adodor consaturated, 15C). The can be resize from hic work) in diame-) lb/cu ft. nd vapors used as a tography, alumina, fused. See aluminum oxide "Alundum."

alumina gel. See aluminum hydroxide gel.

alumina-silica fiber.

Properties: Amorphous structure, excellent resistance to all chemicals except hydrochloric acid and phosphoric acids and concentrated alkalies. Available in both short and long staple. Low heat conductivity, high thermal shock resistance. Tensile strength 400,000 psi, elastic modulus 16 million psi, upper temperature limit in oxidizing atmosphere 800C. Noncombustible.

Derivation: The short fiber type is made by blasting a stream of molten alumina and silica with a steam jet. Long staple is spun from a molten mixture of alumina and silica modified with zir-

Forms: Fibers, sheets, blankets.

Use: Nonwoven fabrics (short staple), woven fabric structures, cordage, thermal insulation, repair of furnace linings, piping molten metals, welding insulation (re-usable), insulation for rocket and space applications. *Note*: In finely divided form, alumina-silica is also used as a catalyst.

alumina trihydrate. (aluminum hydroxide; aluminum hydrate; hydrated alumina; hydrated aluminum oxide). Al₂O₃•3HOH or Al(OH)₃.

Properties: White crystalline powder, balls, or granules; d 2.42; insoluble in water; soluble in mineral acids and caustic soda. Releases water on heating.

Derivation: From bauxite. The ore is dissolved in strong caustic and aluminum hydroxide precipitated from the sodium aluminate solution by neutralization (as with carbon dioxide) or by autoprecipitation (Bayer process).

Grade: Technical, CP.
Use: Glass, ceramics, iron-free aluminum and aluminum salts, manufacture of activated alumina, base for organic lakes, flame retardants, mattress batting. Finely divided form (0.1-0.6 microns) used for rubber reinforcing agent, paper coating, filler, cosmetics.

aluminium. British spelling of aluminum.

aluminon. (aurine tricarboxylic acid, ammonium salt).

Properties: Mw 473.44, mp 220-5C (decomposes). Use: As a reagent for aluminum in solution.

aluminosilicate. A compound of aluminum silicate with metal oxides or other radicals.

Use: Catalyst in refining petroleum, to soften water, and in detergents. The sodium compound, Na₁₂[(AlO₂)₁₂(SiO₂)₁₂]xH₂O, is typical.

See also zeolite, molecular sieve.

aluminum Al. (aluminium). Metallic element of atomic number 13. Group IIIA of the Periodic Table. Atomic weight 26.98154. Valence 3; no stable isotopes, monovalent in high-temperature compounds, i.e., AlCl and AlF. Most abundant metal in earths crust; third most abundant of all elements. Does not occur free in nature.

Properties: Silvery white, crystalline solid. Tensile strength (annealed) 6800 psi, cold-rolled 16,000 psi. D 2.708, mp 660C, bp 2450C. Forms protective coating of aluminum oxide approximately 50 angstroms thick, which makes it highly resistant to ordinary corrosion. Attacked by concentrated and dilute solutions of hydrochloric acid, hot concentrated sulfuric acid and perchloric acid. Also violently attacked by strong alkalies. Rapidly oxidized by water at 180C. Not attacked by dilute or cold concentrated sulfuric acid or concentrated nitric acid. Can ignite violently in powder form. Electrical conductivity approximately two thirds that of copper. Aluminum qualifies as both a light metal and a heavy metal, according to their respective definitions.

Derivation: From bauxite by Bayer process and subsequent electrolytic reduction by Hall process. There are several processes for obtaining ultrapure aluminum: (a) electrolytic (three-layer), (b) zone refining, and (c) chemical refining. Impurities as low as 0.2 ppm are possible.

More efficient processes are the Alcoa and Toth processes which require much less electric power than the Hall process. Another method, using no electricity, involves heating a mixture of aluminum ores with a coal-derived fuel in a closed furnace. Still another process called calsintering, using fly ash as a source of alumina, has been described (1978). See calsintering.

Forms available: Structural shapes of all types, plates, rods, wire foil flakes, powder (technical and USP). Aluminum can be electrolytically coated and dyed by the anodizing process (see anodic coating); it can be foamed by incorporating zirconium hydride in molten aluminum and it is often alloyed with other metals or mechanically combined (fused or bonded) with boron and sapphire fibers or whiskers. Strengths up to 55,000 psi at 500C have been obtained in such composites. A vapor-deposition technique is used to form a tightly adherent coating from 0.2 to 1 mil thick on titanium and steel.

Hazard: Fine powder forms flammable and explosive mixtures in air. TLV: 10 mg/m³ of air, (soluble salts) 2 mg/m³ of air; (alkyls) 2 mg/m³ of air; (welding fumes) 5 mg/m³ of air.

Use: Building and construction, corrosion-resistant chemical equipment (desalination plants), die-cast auto parts, electrical industry (power transmission lines), photoengraving plates, per-

chlorochromic anhydride. See chromy

chlorocosane. See paraffin, chlorinated.

3-chlorocoumarin. C₉H₅O₂Cl.

Properties: Slightly yellow, crystalline solid; mp 118C.

Grade: Technical.

Use: Tin-plating solutions.

p-chloro-m-cresol. See 4-chloro-3-methylphenol.

a-chloro-N.N-diallylacetamide. (CDAA). CICH2CON(CH2CH:CH2)2.

Properties: Amber liquid or granules, bp 74C (0.3 mm), slightly soluble in water, soluble in alcohol, hexane, and xylene.

Hazard: Toxic by ingestion. Dry formulations are irritating to eyes and skin.

Use: Herbicide.

1-chloro-2-dichloroarsinoethene. See β -chlorovinyl dichloroarsine.

Chlorodecone [1,2,3,4,5,5,6,7,8,9,10,10-dodecachlorooctahydro-1,3,4-metheno-2-cyclobuta-CAS: 143-50-0. (c,d)-pentalone]. Properties: Mp 349C (decomposes), solubility in

water 0.4% at 100C.

Use: Insecticide.

2-chloro-1-(2,4-dichlorophenyl)vinyl diethyl phosphate. See diethyl-1-(2,4-dichlorophenyl)-2-chlorovinyl phosphate.

chlorodifluoroacetic acid. CCIF2 COOH. Properties: Colorless, pungent liquid, bp 122C, fp 23C, miscible in water and most organic solvents, strong acid, dissolves cellulose and proteins. Use: Catalyst, particularly for esterification and condensation reactions, herbicides, intermediate.

1,1,1-chlorodifluoroethane. (1,1,1-difluorochloroethane; difluoromonochloroethane). CAS: 75-68-3. CH₃CClF₂.

Properties: Colorless, nearly odorless gas; bp -9.2C; fp -130.8C; d 1.194 (-9C). Insoluble in water.

Hazard: Flammable gas. Explosive limits in air

Derivation: Chlorinating 1,1-difluoroethane in UV light.

Grade: Technical.

Use: Refrigerant, solvent, intermediate.

chlorodifluoromethane. (monochlorodifluoromethane; difluorochloromethane; difluoromono-

d (gas partly at its bp) 4.52g/ 27 --soluble in water.

Derivation: Reaction of chloroform with anhydrous hydrogen fluoride with antimony chloride catalyst.

Grade: Technical, 99.9% pure.

Hazard: Asphyxiant. TLV: 1000 ppm in air. Use: Refrigerant, low-temperature solvent, fluorocarbon resins, especially tetrafluoroethylene See also chlorofluorocarbon. polymers.

1-chloro-2,4-dinitrobenzene. (dinitrochloroben- $C_6H_3(NO_2)_2Cl.$

Properties: Pale yellow needles; almond odor; soluble in hot alcohol, ether, benzene, carbon disulfide; insoluble in water; d 1.69; mp 53C; bp 315C; flash p 382F (194C).

Hazard: Toxic by ingestion, inhalation, and skin absorption. Combustible. Upper explosive limit 22%. A skin irritant.

Derivation: Chlorination of dinitrobenzene.

Grade: Technical, fused. Use: Dyes, organic synthesis.

chlorodiphenyl. CAS: (42% chlorine) 53469-21-9; (54% chlorine) 11097-21-9. Properties: Colorless, mobile liquid; bp 340-375C;

flash p 383F (195C) (OC). Resistant to acids and alkalies.

Grade: 54% chlorine, 42% chlorine.

Hazard: Toxic by ingestion, inhalation, and skin absorption; strong irritant. TLV: (54% Cl) 0.5 mg/m³ of air. (42% chlorine) 1 mg/m³ of air. Use: Plasticizer for cellulosics, vinyl resins, and chlorinated rubbers. See also diphenyl.

4-chlorodiphenyi sulfone. See p-chlorophenyi phenyl sulfone.

1-chloro-2,3-epoxypropane. See epichlorohy-

2-chloroethanamide. See chloroacetamide.

chloroethane. See ethyl chloride.

chloroethane nitrile. See chloroacetonitrile.

chloroethanoic anhydride. See chloroacetic anhydride.

2-chloroethanol. See ethylene chlorohydrin.

chloroethene. See vinyl chloride.

chloroethyl alcohol. See ethylene chlorohydrin.

(a) 3.012; (b) 1.867; (c) 1.70. (a) Insoluble in water and acids; (b) soluble in water, insoluble in alcohol; (c) soluble in water and alcohol.

Derivation: Action of sulfuric acid on chromium hydroxide with subsequent crystallization.

Use: Chrome plating, chromium alloys, mordant, catalyst, green paints and varnishes, green ink, ceramics (glazes). The basic form (reduction of sodium dichromate) is used in tanning.

chromite. (chrome iron ore).

CAS: 1308-31-2. FeCr₂O₄. A natural oxide of ferrous iron and chromium, sometimes with magnesium and aluminum present. Usually occurs in magnesium and iron rich igneous rocks. Properties: Color iron-black to brownish-black, streak dark brown, luster metallic to submetallic, d 3.6, Mohs hardness 5.5.

Grade: Metallurgical, refractory, chemical.

Occurrence: USSR, South Africa, Zimbabwe, Philippines, Cuba, Turkey.

Hazard: A carcinogen. TLV: 0.05 mg/m³ of air. Use: Only commercial source of chromium and its compounds.

chromium. CAS: 7440-47-3. Cr. Metallic element of atomic number 24, group VIB of the Periodic Table, aw 51.996, valences=2,3,6; 4 stable isotopes. Name derived from Greek for color.

Properties: Hard, brittle, semi-gray metal; d 7.1; mp 1900C; bp 2200C. Compounds have strong and varied colors. Cr ion forms many coordination compounds. Exists in active and passive forms, the latter giving rise to its corrosion resistance due to a thin surface oxide layer that passivates the metal when treated with oxidizing agents. Active form reacts readily with dilute acids to form chromous salts. Soluble in acids (except nitric) and strong alkalies, insoluble in water.

Occurrence: USSR, South Africa, Turkey, Philippines, Zimbabwe, Cuba.

Derivation: From chromite by direct reduction (ferrochrome), by reducing the oxide with finely divided aluminum or carbon, and by electrolysis of chromium solutions.

Grade: (ore): Chromium ores are classified as (1) metallurgical, (2) refractory, and (3) chemical and their consumption in the US is in that order. (1) Must contain a minimum of 48% Cr₂O₃ and have Cr-Fe ratio of 3:1; (2) must be high in Cr₂O₃, and Al₂O₃ and low in iron; (3) must be low in SiO₂ and Al₂O₃ and high in Cr₂O₃.

Forms available: (1) Chromium metal as lumps, granules or powder; (2) high- or low-carbon ferrochromium; (3) single crystals, high-purity crystals, or powder run 99.97% pure.

Hazard: Hexavalent chromium compounds are

carcinogenic (OSHA) and corrosive on tissue, resulting in ulcers and dermatitis on prolonged contact. TLV: For chromium dust and fume is 0.5 mg/m³ of air.

Use: Alloying and plating element on metal and plastic substrates for corrosion resistance, chromium-containing and stainless steels, protective coating for automotive and equipment accessories, nuclear and high-temperature research, constituent of inorganic pigments.

chromium-51. Radioactive Chromium of mass number 51.

Properties: Half-life 26.5D, radiation: gamma (0.32 MeV).

Grade: USP (as sodium chromate Cr-51 injection).

Hazard:Radioactive poison.

Use: Diagnosis of blood volume (as tracer).

chromium acetate. See chromic acetate.

chromium acetylacetonate. [CH₃COCHC(CH₃)O]₃Cr.

Properties: Purple powder or red-violet crystals, mp 216C, bp 340C, insoluble in water, soluble in acetone and alcohol.

Derivation: Reaction of chromium chloride, acetylacetone and sodium carbonate.

Use: Reduction of detonation of nitromethane.

chromium ammonium sulfate. (ammonium chromium sulfate; chrome ammonium alum). CrNH₄(SO₄)₂•12HOH.

Properties: Green powder or deep violet crystals, d 1.72, mp 94C. Soluble in water, slightly soluble in alcohol. The aqueous solution is violet when cold, green when hot.

Grade: Technical.
Use: Mordant, tanning.

chromium boride. One of several compounds of chromium and boron, e.g., CrB, CrB₂, and Cr₂B₂. They have high melting points, are very hard and corrosion-resistant and may be suitable for use in jet and rocket engines.

Properties: CrB may be crystals, d 6.2, mp 1550C, Mohs hardness 8.5, resistivity 67 μ-ohm cm (20C). CrB₂: d 5.15, mp 1850C, hardness 2010 (Knoop), resists oxidation up to 1100C. Cr₂B₂: may be crystals, d 6.1, Mohs hardness 9+.

Use: Metallurgical additives, high-temperature electrical conductors, cermets, refractories, coatings resistant to attack by molten metals.

chromium bromide. See chromous bromide.

chromium carbide. Cr₃C₂.

Properties: Ortho-rhombic crystals, d 6.65, microhardness 2700 kg/sq mm (load 50 g), mp 1890C, oils and water. Most important types are Congo, kauri, and manila.

Cope elimination reaction. Formation of an olefin and a hydroxylamine by pyrolysis of an amine

Cope rearrangement. Thermal isomerization of 1,5-dienes by 1 3,3-sigmatropic shift.

"Copel."166 TM for 55-45 copper-nickel alloy used as a resistor material in the construction of electrical instruments where temperature coefficient of resistance must be very low.

Cope's rule. The tendency for body size to increase during the evolution of a group of animals.

copolymer. An elastomer produced by the simultaneous polymerization of two or more dissimilar monomers, as SBR synthetic rubber from styrene and butadiene.

Metallic Cu. copper. CAS: 7440-50-8. element of atomic number 29, of group IB of the periodic system, aw 63.546, valences 1, 2;

two stable isotopes. Properties: Distinctive reddish color, d 8.96, mp 1083C, bp 2595C, ductile, excellent conductor of electricity. Complexing agent, coordination numbers 2 and 4. Dissolves readily in nitric and hot concentrated sulfuric acids; in hydrochloric and dilute sulfuric acids slowly, but only when exposed to the atmosphere. More resistant to atmospheric corrosion than iron, forming a green layer of hydrated basic carbonate. Readily attacked by alkalies. A necessary trace element in human diet, a factor in plant metabolism. Essentially nontoxic in elemental form. Noncombustible, except as powder.

Ores: Azurite, azurmalachite, chalococite, chalcopyrite (copper pyrites), covellite, cuprite mala-

Sources: Michigan, Arizona, Utah, Montana, New chite. Mexico, Nevada, Tennessee, Chile, Canada, USSR, Zambia, Zaire.

Derivation: Varies with the type of ore. With sulfide ores, the steps may be (1) concentration (of low grade ores) by flotation and leaching, (2) roasting, (3) formation of copper "matte" (40-50% Cu), (4) reduction of matte to "blister" copper (96-98%), (5) electrolytic refining to 99.9+% copper.

Forms available: Ingot, sheet, rod, wire, tubing, shot, powder, high purity (impurities less than 10 ppm) as single crystals or whiskers.

Hazard: Flammable in finely divided form. TLV: (fume) 0.2 mg/m³, (dusts and mists) 1 mg/m³. Use: Electric wiring; switches, plumbing, heating,

roofing and building construction; chemical and pharmaceutical machinery; alloys (brass, bronze, Monel metal, beryllium-copper); electroplated protective coatings and undercoats for nickel, chromium, zinc, etc., cooking utensils; corrosionresistant piping; insecticides; catalyst; antifouling paints. Flakes used as insulation for liquid fuels. Whiskers used in thermal and electrical compos-

copper abietate. (cupric abietate).

Cu(C20H29O2)2. Properties: Green scales, soluble in alcohol and in oils with fine green color, insoluble in water. Derivation: Heating copper hydroxide with abietic acid.

Use: Preservative metal paint, fungicide.

copper acetate. (cupric acetate; crystals of Venus; CAS: 142-71-2. verdigris, crystallized). $Cu(C_2H_3O_2)_2 \cdot H_2O$.

Properties: Greenish-blue, fine powder. Soluble in water, alcohol and ether. D 1.9, mp 115C, decomposes at 240C.

Derivation: Action of acetic acid on copper oxide and subsequent crystallization.

Use: Pesticide, catalyst, fungicide, pigments, manufacture of Paris green.

copper acetate, basic. (copper subacetate; verdigris; verdigris blue; verdigris green).

Properties: Masses of minute, silky crystals either pale green or bright blue in color. Blue variety approximate formula (C2H3O2)2Cu2O. Green variety approximate formula CuO·2Cu(C2H3O2)2. Coppery taste. The green rust with which uncleaned copper vessels become coated and which is commonly termed verdigris is a copper carbonate and must not be confused with true verdigris. Apart from its impurities, verdigris is a variable mixture of the basic copper acetates. Soluble in acids, very slightly soluble in water and alcohol. Derivation: Action of acetic acid on copper in the presence of air.

Use: Paint pigment, insecticide, fungicide, mildew preventive, mordant in dyeing and printing.

copper acetoarsenite. (cupric acetoarsenite; Paris green; king's green; Schweinfurt green; im- $(CuO)_3As_2O_3 \cdot Cu(Cu_2H_3O_2)_2$. perial green). Properties: Emerald-green powder. Soluble in acids, insoluble in alcohol and water. Phytotoxic. Derivation: By reacting sodium arsenite with copper sulfate and acetic acid.

Hazard: Toxic by ingestion.

Use: Wood preservative, larvicide, marine antifouling paints.

copper acetylacetonate. (copper-2,4-penta-Crystalline Cu(C₅H₇O₂)₂. nedione). powder, slightly soluble in water and alcohol, lava. Molten rock (magma) that has reached the surface of the earth.

lavandin oil. See lavender oil.

lavender oil. CAS: 8000-28-0. An essential oil used in perfumery, 35% ester content as linalyl acetate required. Terpeneless grade has about twice the concentration of the natural oil.

"Lavenol." 188 TM for a series of synthetic lavender oil substitute of various types.

Lavoisier, Antoine Laurent. (1743-1794) A French chemist generally regarded as the "father" of chemistry. His "Traite Elementaire de Chimie" (1789) listed 30 elements, clarified the nomenclature of acids, bases and salts, and described the composition of numerous organic substances. He erroneously believed that oxygen is the characteristic element of acids. However, his fundamental work on combustion, as a result of which he identified and named nitrogen (azote), and on the separation of hydrogen from water by a unique reduction experiment carried out in a heated gun barrel, earned him a leading position among early chemists. See also Mendeleef.

Lawrence, Ernest O. (1901-1958) An American physicist who invented the cyclotron in 1929. Both the element lawrencium and the Lawrence Livermore Research Laboratory at the University of California were named after him. See also cyclotron, bombardment.

lawrencium. CAS: 22537-19-5. Lr. A synthetic radioactive element with atomic number 103, discovered in 1961, aw 257, only one other isotope is known (256); the 257 isotope has a half-life of 8 seconds. It has been made by bombarding californium with boron ions. It exhibits alpha radiation. See actinide series.

lay-up. In the reinforced plastics industry, a term used to refer to placement of the reinforcing material in the mold.

ic. (lethal concentration 50%). That quantity of a substance administered by inhalation that is necessary to kill 50% of test animals exposed to it within a specified time. The test applies not only to gases and vapors but to fumes, dusts, and other particulates, suspended in air.

LCL. Abbreviation for "less than carload lot," used by shippers, traffic managers, railroads, etc.

LD₅₀ (lethal dose 50%). That quantity of a substance necessary to kill 50% of exposed animals in laboratory tests within a specified time. A substance having an oral LD₅₀ of less than 400 mg/ kg of body weight is considered to be highly toxic.

LDPE. Abbreviation for low-density polyethylene.

leaching. See solvent extraction.

lead. CAS: 7439-92-1. (from Latin Metallic element of atomic numplumbum). ber 82, Group IVA of the periodic table, aw 207.2, valences = 2,4, four stable isotopes. The isotopes are the end products of the disintegration of three series of natural radioactive elements uranium (206), thorium (208), and actinium (207).

Properties: Heavy, ductile, soft, gray solid, d 11.35, mp 327.4C, bp 1755C, soluble in dilute nitric acid, insoluble in water but dissolves slowly in water containing a weak acid, resists corrosion, relatively impenetrable to radiation. Poor electrical conductor, good sound and vibration absorber. Noncombustible.

Occurrence: US, Mexico, Canada, South America, Australia, Africa, Europe.

Derivation: Roasting and reduction of galena (lead sulfide), anglesite (lead sulfate), and cerussite (lead carbonate). Also from scrap.

Purification method: Desilvering (Parkes process), electrolytic refining (Betts process), pyrometallurgical refining (Harris process). Bismuth is removed by Betterton-Kroll process.

Grade: High purity (less than 10 ppm impurity), pure (99.9+%), powdered (99% pure), pig lead, paste.

Forms available: Ingots, sheet, pipe, shot, buckles or straps, grids, rod, wire, etc.; paste; powder; single crystals.

Hazard: Toxic by ingestion and inhalation of dust or fume. TLV (as Pb): (fumes and dusts and inorganic compounds) 0.15 mg/m³ of air. For ambient air the EPA standard is 1.5 micrograms/ m³. A cumulative poison. FDA regulations require zero lead content in foods and less than 0.05% in house paints.

Use: Storage batteries, tetraethyllead (gasoline additive), radiation shielding, cable covering, ammunition, chemical reaction equipment (piping, tank linings, etc.), solder and fusible alloys, type metal, vibration damping in heavy construction, foil, babbit and other bearing alloys. For further information, refer to Lead Industries Association, 292 Madison Ave., New York.

lead acetate. (sugar of lead). CAS: 301-04-2. $Pb(C_2H_3O_2)_2 \cdot 3H_2O$.

Properties: White crystals or flakes (commercial grades are frequently brown or gray lumps),

6.844 microhm-cm. Attacked slightly by hydrochloric acid and sulfuric acid, somewhat more by nitric acid, highly resistant to strong alkalies. Occurrence: Ontario, Cuba, Norway, Dominican Republic.

Derivation: Nickel ores are of two types, sulfide and oxide, the former accounting for two-thirds of the world's consumption. Sulfide ores are refined by flotation and roasting to sintered nickel oxide, and either sold as such or reduced to metal, which is cast into anodes and refined electrolytically or by the carbonyl process (See Mond process). Oxide ores are treated by hydrometal-lurgical refining, e.g., leaching with ammonia. Much secondary nickel is recovered from scrap. Grade: Electrolytic, ingot, pellets, shot, sponge, powder, high-purity strip, single crystals.

Hazard: Flammable and toxic as dust or fume. A carcinogen (OSHA). TLV: (metal) 1 mg/m³ of air; (soluble compounds) (as nickel): 0.1 mg/m³ of air.

Use: Alloys (low-alloy steels, stainless steel, copper and brass, permanent magnets, electrical resistance alloys), electroplated protective coatings, electroformed coatings, alkaline storage battery, fuel cell electrodes, catalyst for methanation of fuel gases and hydrogenation of vegetable oils.

See also Raney's nickel.

nickel acetate. CAS: 373-02-4. Ni(OOCCH₃)₂-4HOH.

Properties: Green, monoclinic crystals; effloresces somewhat in air. D 1.74, decomposes on heating to 250C, soluble in water and alcohol.

Derivation: By heating nickel hydroxide with acetic acid in the presence of metallic nickel. Hazard: Toxic by ingestion, a carcinogen (OSHA). Use: Textiles (mordant), catalyst.

nickel acetylacetonate. CAS: 3264-82-2. (CH₃COCHCOCH₃)₂Ni.

Properties: Green, crystalline solid; mp 230C; bp 220C (11 mm); d 1.45. Soluble in water, alcohol, and benzene; insoluble in ether.
Use: Catalyst for organic reactions.

aickel aluminide. A cermet that can be flamesprayed.

mickel ammonium chloride. (ammonium nickel chloride). (a) NiCl₂·NH₄Cl, (b) NiCl₂·NH₄Cl·6HOH.

Properties: (a) Yellow powder, (b) green crys-

tals, d 1.65, soluble in water, deliquescent.

Hazard: See nickel.

Use: Electroplating, dyeing (mordant).

akkel ammonium sulfate. (nickel salts, double; ammonium nickel sulfate).

CAS: 15699-18-0.

NiSO4 · (NH4)2SO4 · 6HOH.

Properties: Green crystals, decomposed by heat, soluble in water, less in ammonium sulfate solution, insoluble in alcohol, d 1,929.

Derivation: An aqueous solution of nickel sulfate is acidified with sulfuric acid, then an aqueous solution of ammonium sulfate is added. On concentrating, crystals of the double sulfate separate out.

Hazard: See nickel.

Use: Nickel electrolyte for electroplating.

nickel arsenate. (nickelous arsenate). Ni₃(AsO₄)₂•8HOH.

Properties: Yellow-green powder, soluble in acids, insoluble in water, d 4.98.

Hazard: Highly toxic.

Use: Catalyst (hardening fats used in soap).

nickel bromide. (nickelous bromide). CAS: 13462-88-9. (a) NiBr₂,

(b) NiBr2·3HOH.

Properties: (a) Brownish-yellow solid or yellow, lustrous scales; d 5.098; mp 963C. (b) Deliquescent, greenish scales; loses 3HOH at 300C; soluble in water, alcohol, ether, and ammonium hydroxide.

Derivation: Bromination of nickel powder or nickel carbonyl.

Hazard: See nickel.

nickel carbonate, basic. CAS: 3333-67-3. NiCO₃·2Ni(OH)₂·4HOH.

Properties: Light green crystals or brown powder, d 2.6, insoluble in water, soluble in ammonia and dilute acids.

Derivation: (1) In nature as the mineral zaratite. (2) Synthetically, by addition of soda ash to a solution of nickel sulfate.

Hazard: See nickel.

Use: Electroplating, preparation of nickel catalysts, ceramic colors and glazes.

nickel carbonyl. (nickel tetracarbonyl).

CAS: 13463-39-3. Ni(CO)₄. A zero-valent compound. The four carbonyl groups form a tetrahedral arrangement and are linked covalently to the metal through the carbons.

Properties: Colorless liquid, soluble in alcohol and many organic solvents, soluble in concentrated nitric acid, insoluble in water, d 1.3185, fp -19C, bp 43C, vap press 400 mm at 25.8C.

Derivation: By passing carbon monoxide gas over finely divided nickel.

Grade: Technical.

Hazard: Flammable, dangerous fire risk, explodes at 60C (140F). A carcinogen (OSHA). TLV (as nickel): 0.05 ppm in air.

Use: Etching on zinc, indelible ink, microscopy, mirrors, photography, plating, catalyst, determination of potassium.

sodium-o-chlorotoluene-p-sulfonate.

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Properties: Gray to light tan powder, soluble in water and organic solvents.

Derivation: Sulfonation of o-chlorotoluene, neutralized to form the sodium salt.

Use: Synthesis of dyes, intermediates and drugs.

sodium chromate. CAS: 7775-11-3.

Na₂CrO₄ · 10HOH.

Properties: Yellow, translucent, efflorescent crystals; soluble in water; slightly soluble in alcohol. D 1.483, mp 19.92C, anhydrous sodium chromate is also available commercially.

Derivation: Chrome iron ore is melted in a reverberatory furnace with lime and soda, in presence of air. The melt is dissolved in water, a small amount of sodium carbonate added, the solution decanted, acidified with acetic acid, concentrated, and crystallized.

Grade: Pure neutral, highest purity, technical, CP, reagent.

Hazard: Toxic material. TLV (as chromium): 0.5 mg/m³ of air.

Use: Inks, dyeing, paint pigment, leather tanning, other chromates, protection of iron against corrosion, wood preservative.

sodium chromate tetrahydrate.

Na₂CrO₄•4HOH.

Properties: Yellow crystals, deliquescent, soluble in water.

Grade: Technical.

Hazard: As for sodium chromate.

Use: Pigment manufacture, corrosion inhibition, leather tanning, other chromium compounds.

sodium citrate. (trisodium citrate). CAS: 68-04-2. C₆H₅O₇Na₃ • 2HOH.

Properties: White crystals or granular powder, odorless, stable in air, pleasant acid taste, soluble in water, insoluble in alcohol, mp loses 2HOH at 150C, bp decomposes at red heat. Combustible.

Derivation: Sodium sulfate solution is treated with calcium citrate, filtered, concentrated and crystallized.

Grade: Highest purity, medicinal; pure; commercial; CP; USP; FCC.

Use: Soft drinks, photography, frozen desserts, meat products, detergents, special cheeses, electroplating, sequestrant and buffer, nutrient for cultured buttermilk, removal of sulfur dioxide from smelter waste gases, medicine (diuretic, expectorant), anticoagulant for blood withdrawn from body.

sodium copper chloride. See copper sodium chloride.

sodium copper cyanide. (copper sodium cyanide; sodium cyanocuprate). NaCu(CN)₂.

Properties: White, crystalline, double salt of copper cyanide and sodium cyanide; d 1.013 (20C); decomposes at 100C; soluble in water.

Hazard: Toxic material. TLV (as CN): 5 mg/m³ of air.

Use: For preparing and maintaining cyanide copper plating baths based on sodium cyanide.

sodium cyanate. CAS: 917-61-3. NaOCN. Properties: White, crystalline powder; soluble in water; insoluble in alcohol and ether; d 1.937 (20C); mp 700C.

Use: Organic synthesis, heat treating of steel, intermediate for manufacture of medicinals.

sodium cyanide. CAS: 143-33-9. NaCN. Properties: White, deliquescent, crystalline powder; soluble in water; slightly soluble in alcohol. Mp 563C, bp 149C, the aqueous solution is strongly alkaline and decomposes rapidly on standing.

Derivation: By absorption of hydrogen cyanide in a solution of sodium hydroxide with subsequent vacuum evaporation.

Grade: 30% solution, 73-75%, 96-98%, reagent, technical, briquettes, granular.

Hazard: Toxic by ingestion and inhalation. TLV (as CN): 5 mg/m³ of air.

Use: Extraction of gold and silver from ores, electroplating, heat treatment of metals (case-hardening), making hydrogen cyanide, insecticide, cleaning metals, fumigation, manufacture of dyes and pigments, nylon intermediates, chelating compounds, ore flotation.

sodium cyanoaurite. See sodium gold cyanide.

sodium cyanocuprate. See sodium copper cyanide.

sodium-2-cyanoethanesulfonate. (sodium-2-sulfopropionitrile). NaO₃S(CH₂)₂CN.

Properties: Colorless crystals; mp 240C; soluble in water and glacial acetic acid; insoluble in benzene, alcohol, and ether.

Use: Introduction of sulfonic acid group into surfactants and other organics.

sodium cyclamate. (sodium cyclohexylsulfamate). CAS: 139-05-9. C₆H₁₁NHSO₃Na.

Properties: White crystals; practically odorless powder; sweet taste; freely soluble in water; practically insoluble in alcohol, benzene, chloroform,

magnesia, fused. Used as a refractory and to handle electricity at high temperatures. See "Magnorite."

magnesia, lightburned. A special high-purity magnesium oxide.

magnesite. (natural magnesium carbonate). (MgCO₃). The term magnesite is loosely used as a synonym for magnesia as are also the terms caustic-calcined magnesite, dead-burned magnesite, and synthetic magnesite.

Hazard: A nuisance particulate. Properties: White, yellowish, grayish-white, or brown crystalline solid; d 3-3.12; Mohs hardness

3.5-4.5.

Occurrence: US (California, Washington, Nevada), Austria, Greece.

Use: To make the various grades of magnesium oxide, to produce carbon dioxide, refractory. See also magnesium carbonate and following en-

magnesite, burnt. See magnesite, dead-burned.

magnesite, caustic-calcined. (caustic-calcined magnesia; calcined magnesite; calcined magnesia). Principally magnesia (magnesium oxide) MgO). The product obtained by firing magnesite or other substances convertible to magnesia upon heating at some temperature below 1450C so that some carbon dioxide is retained (2-10%) and the magnesium oxide displays adsorptive capacity or activity.

Grade: Technical, chemical, synthetic rubber,

USP (light, medium light, heavy).

Use: Magnesium oxychloride and oxysulfate cements, 85% magnesia insulation, rubber (reinforcing agent, accelerator), uranium processing, chemical processing, rayon, refractories, paper pulp, acid-neutralizing fertilizers, welding rod coatings, fillers, glass constituents, abrasives. See also magnesium oxide.

magnesite, dead-burned. (burnt magnesia; deadburned magnesia; refractory magnesia; burnt magnesite; (magnesium oxide), MgO). The granular product obtained by burning (firing) magnesite or other substances convertible to magnesia upon heating above 1450C long enough to form granules suitable for use as a refractory (ASTM). Synthetic magnesium hydroxide or chloride is sometimes used instead of magnesite as a source. Grade: 85-87% (from magnesite ores); 97-99% (from sea water and brines).

Use: Refractories, as grains or basic brick, the latter especially in open hearth furnaces for steel, furnaces for nonferrous metal smelting, and in cement and other kilns.

See also magnesium oxide.

magnesite, synthetic. Magnesium oxide, Mgt obtained from sea water, sea water bittern well brines. The preliminary product is use magnesium hydroxide or chloride, which is heated, or sometimes treated with steam heated in the case of the chloride, to obtain oxide. Synthetic magnesite constitutes the p grades of dead-burned magnesite.

magnesium. CAS: 7439-95-4. Metallic element of atomic number 12; Gr IIA of the Periodic Table; aw 24.305; vak = 2: 3 isotopes.

Properties: Silvery, moderately hard, allai earth metal; readily fabricated by all stanmethods; lightest of the structural metals, str reducing agent; electrical conductivity simila aluminum. D 1.74, mp 650C, bp 1107C, xxx in acids, insoluble in water. Magnesium a central element of the chlorophyll molecule is also an important component of red blood. puscles.

Sources: Magnesite and dolomite; sea water brines.

Derivation: (a) Electrolysis of fused magnes chloride (Dow sea water process), (b) reduct of magnesium oxide with ferrosilicon (Pulge

Forms available: Ingots, bars, fine powder (up 99.6% pure), sheet and plate, rods, tubing t

bon, flakes.

Hazard: (solid metal) Combustible at 650C. (p. der, flakes, etc.): Flammable, dangerous fire le ard. Use dry sand or tale to extinguish.

Use: Aluminum alloys for structural parts, a cast auto parts, missiles, space vehicles; posé for pyrotechnics and flash photography, prote tion of iron, nickel, zinc, titanium, zirconsu antiknock gasoline additives; magnesium ou pounds and Grignard syntheses; cathodic prom tion; reducing agent; desulfurizing iron in un manufacture; precision instruments; optical rors; dry and wet batteries.

magnesium acetate. CAS: 142-72-3. Mg(OOCCH₃)₂ or (b) Mg(OOCCH₃)₂·4HO Properties: Colorless, crystalline aggregate . monoclinic crystals; acetic acid odor; (a) a 323C, d 1.42; (b) mp 80C, d 1.45; soluble a water and dilute alcohol.

Derivation: Interaction of magnesium carbona and acetic acid.

Use: Dye fixative in textile printing, decodorus disinfectant, and antiseptic.

magnesium acetylacetonate. Mg(C₅H₇O₂)₂. Crystalline powder, slightly soluble in water, sistant to hydrolysis, a chelating nonionizing compound.

magnesia, fused. Used as a refractory and to handle electricity at high temperatures. See "Magnorite."

magnesia, lightburned. A special high-purity magnesium oxide.

magnesite. (natural magnesium carbonate). (MgCO₃). The term magnesite is loosely used as a synonym for magnesia as are also the terms caustic-calcined magnesite, dead-burned magnesite, and synthetic magnesite. Hazard: A nuisance particulate.

Properties: White, yellowish, grayish-white, or brown crystalline solid; d 3-3.12; Mohs hardness

Occurrence: US (California, Washington, Nevada), Austria, Greece.

Use: To make the various grades of magnesium oxide, to produce carbon dioxide, refractory. See also magnesium carbonate and following en-

magnesite, burnt. See magnesite, dead-burned.

magnesite, caustic-calcined. (caustic-calcined magnesia; calcined magnesite; calcined magnesia). Principally magnesia (magnesium oxide) The product obtained by firing magnesite or other substances convertible to magnesia upon heating at some temperature below 1450C so that some carbon dioxide is retained (2-10%) and the magnesium oxide displays adsorptive capacity or activity.

Grade: Technical, chemical, synthetic rubber, USP (light, medium light, heavy).

Use: Magnesium oxychloride and oxysulfate cements, 85% magnesia insulation, rubber (reinforcing agent, accelerator), uranium processing, chemical processing, rayon, refractories, paper pulp, acid-neutralizing fertilizers, welding rod coatings, fillers, glass constituents, abrasives. See also magnesium oxide.

magnesite, dead-burned. (burnt magnesia; deadburned magnesia; refractory magnesia; burnt magnesite; (magnesium oxide), MgO). The granular product obtained by burning (firing) magnesite or other substances convertible to magnesia upon heating above 1450C long enough to form granules suitable for use as a refractory (ASTM). Synthetic magnesium hydroxide or chloride is sometimes used instead of magnesite as a source. Grade: 85-87% (from magnesite ores); 97-99% (from sea water and brines).

Use: Refractories, as grains or basic brick, the latter especially in open hearth furnaces for steel, furnaces for nonferrous metal smelting, and in cement and other kilns.

See also magnesium oxide.

magnesite, synthetic. Magnesium oxide, MgO, as obtained from sea water, sea water bitterns, or well brines. The preliminary product is usually magnesium hydroxide or chloride, which is then heated, or sometimes treated with steam and heated in the case of the chloride, to obtain the oxide. Synthetic magnesite constitutes the purer grades of dead-burned magnesite.

magnesium. CAS: 7439-95-4. Mg. Metallic element of atomic number 12; Group IIA of the Periodic Table; aw 24.305; valence = 2; 3 isotopes.

Properties: Silvery, moderately hard, alkalineearth metal; readily fabricated by all standard methods; lightest of the structural metals; strong reducing agent; electrical conductivity similar to aluminum. D 1.74, mp 650C, bp 1107C, soluble in acids, insoluble in water. Magnesium is the central element of the chlorophyll molecule; it is also an important component of red blood corpuscles.

Sources: Magnesite and dolomite; sea water and

Derivation: (a) Electrolysis of fused magnesium chloride (Dow sea water process), (b) reduction of magnesium oxide with ferrosilicon (Pidgeon process).

Forms available: Ingots, bars, fine powder (up to 99.6% pure), sheet and plate, rods, tubing, rib-

Hazard: (solid metal) Combustible at 650C. (powder, flakes, etc.): Flammable, dangerous fire hazard. Use dry sand or tale to extinguish.

Use: Aluminum alloys for structural parts, diecast auto parts, missiles, space vehicles; powder for pyrotechnics and flash photography, production of iron, nickel, zinc, titanium, zirconium; antiknock gasoline additives; magnesium compounds and Grignard syntheses; cathodic protection; reducing agent; desulfurizing iron in steel manufacture; precision instruments; optical mirrors; dry and wet batteries.

magnesium acetate. CAS: 142-72-3. Mg(OOCCH₃)₂ or (b) Mg(OOCCH₃)₂·4HOH. Properties: Colorless, crystalline aggregate or monoclinic crystals; acetic acid odor; (a) mp 323C, d 1.42; (b) mp 80C, d 1.45; soluble in water and dilute alcohol.

Derivation: Interaction of magnesium carbonate and acetic acid.

Use: Dye fixative in textile printing, deodorant, disinfectant, and antiseptic.

magnesium acetylacetonate. Mg(C5H7O2)2. Crystalline powder, slightly soluble in water, resistant to hydrolysis, a chelating nonionizing compound.

N-methyl morpholine. CAS: 109-02-4.

CH2CH2OCH2CH2NCH3.

Properties: Water-white liquid with ammonia odor, forms constant-boiling mixture with 25% water and boiling at 97C, miscible with benzene, water, d 0.921 (20/20C, bp 115.4C, fp -66C, flash p (TOC) 75F (23.9C).

Grade: Technical.

Hazard: Flammable, dangerous fire risk. Skin irritant.

Use: Catalyst in polyurethane foams, extraction solvent, stabilizing agent for chlorinated hydrocarbons, self-polishing waxes, oil emulsions, corrosion inhibitors, pharmaceuticals.

methyl myristate. (methyl tetradecanoate).
CH₃(CH₂)₁₂COOCH₃. The methyl ester of myristic acid.

Properties: Colorless liquid, mp 17.8C, bp 186.8C (30 mm), 157.5C (1 mm), refr index 1.4351 (25C), insoluble in water. Combustible.

Derivation: (a) Esterification of myristic acid with methanol, (b) alcoholysis of coconut oil with methanol.

Method of purification: Vacuum fractional distillation.

Grade: Technical (93%), purified (99.8+%).
Use: Intermediate for myristic acid detergents, emulsifiers, wetting agents, stabilizers, resins, lubricants, plasticizers, textiles, animal feeds, standard for gas chromatography, flavoring.

methyl myristoleate.

CH₃(CH₂)₃CH:CH(CH₂)₇COOCH₃. The methyl ester of myristoleic acid (cis-tetradec-9-enoic acid).

Properties: Colorless liquid, insoluble in water, soluble in alcohol and ether, bp 108.9C (1 mm). Combustible.

Use: Purified product used in medical research and organic synthesis.

α-methylnaphthalene. CAS: 90-12-0. C₁₀H₇CH₃.

Properties: Colorless liquid, d 1.025, fp -32C, bp 240-243C, refr index 1.6140 (25C), insoluble in water, soluble in alcohol and ether, autoign temperature 984F (529C). Combustible.

Derivation: From coal tar. Hazard: Moderate fire risk. Use: Organic synthesis.

β-methylnaphthalene. CAS: 91-57-6. C₁₀H₇CH₃.

Properties: Solid, d 0.994 (40/4C), bp 241-242C, mp 34C, refr index 1.6015 (25C), insoluble in water, soluble in alcohol and ether. Combustible. Derivation: From coal tar.

Grade: Technical, 95% min. Use: Organic synthesis, insecticides.

2-methyl-1,4-naphthoquinone. See menadione.

methyl naphthyl dodecyl dimethylammonium chloride. C₁₀H₇HC₂C₁₂H₂₅(CH₃)₂NCl. Quaternary ammonium salt.

Properties: White to slightly yellow, crystalline powder with mild odor and taste; mp 159-160C; bulk d 5 lb/gal; soluble in cold water, lower alcohols, glycerin, and acetone; pH of 5% solution 8.9.

Grade: Min purity 97%.

Use: Germicide.

methyl naphthyl ether. See β -naphthyl methyl ether.

methyl nitrate. CAS: 598-58-3. CH₂NO₃. Properties: Colorless liquid, bp 66C (explodes), d 1.217 (15C), slightly soluble in water, soluble in alcohol and ether.

Derivation: By reaction of nitric acid and methanol in the presence of urea.

Hazard: Explodes when heated, severe hazard when exposed to heat or shock. Narcotic, strong irritant to tissue.

Use: Rocket propellant.

methyl nitrite. CAS: 624-91-9. CH₃NO₂. Properties: A gas, bp -12C, fp -17C, d 0.991 at 15C.

Hazard: Severe explosion risk when shocked or heated. Toxic by inhalation, narcotic. Use: Synthesis of nitrile and nitroso esters.

methylnitrobenzene. See nitrotoluene.

4-methyl-2-nitrophenol. See 2-nitro-p-cresol.

methyl-4-nitrosoperfluorobutyrate. A monomer for a nitroso ester terpolymer, prepared by reacting methyl nitrite with perfluorosuccinic and perfluoroglutaric anhydrides. The reaction is exothermic and gives high conversion to liquid nitrile esters, which yield nitroso esters on pyrolysis or photolysis.

N-methyl-N-nitroso-p-toluenesulfonamide. CH₃C₆H₄SO₂N(NO)CH₃.

Properties: Fine, yellow crystals; mp 56-59C; soluble in ether and most organic solvents; insoluble in water

Use: Reagent for the preparation of diazomethane.

methyl nonadecanoate. CH₃(CH₂)₁₇COOCH₃. The methyl ester of nonadecanoic acid. Properties: White, waxy solid. Mp 39.5C, bp 190.5C (3.75 mm), insoluble in water, soluble in alcohol and ether. Combustible.

United States Environmental Protection Agency

Technology Transfer

Process Design Manual

Municipal Sludge Landfills



TABLE 3-5
CHEMICAL COMPOSITION OF MUNICIPAL WASTEWATER SLUDGES^a [14]

Component	Units	Number of samples	Range	Median	Mean	Coefficient of variability, 10
Total N	20	191	0.1-17.6	3.3	3.9	85
NH ₄ -N		103	0.1- 6.8	0.1	0.7	171
NO3-N		45	0.1- 0.5	ŭ. i	0.1	158
NO3-N P		189	0.1-14.3	2.3	2.5	61
K		192	0.1- 2.6	ŭ. 3	U. 4	99
Ca		193	0.1-25.0	3.9	4.9	
Mg .		189	0.1- 2.0	0.5	0.5	87 75
fe		165	0.1-15.3	1.1	1.3	73 148
Mn	mg/kg ^b	143	18-7,100	260	200	-
B		109	4-760		380	209
Hg				33	77	162
Cu		78	0.5-10,600	5	733	232
		205	84-10,400	850	1,210	138
<u>Zn</u>		208	101-27,800	1,740	2,790	134
Ni		165	2- 3,520	82	320	162
26		189	13-19,700	500	1,360	177
Cd		189	3- 3,410	16	110	157

Oata are from numerous types of sludges (anaerobic, aerobic, activated, lagoon, etc.) in seven states: Wisconsin, Michigan, New Hampshire, New Jersey, Illinois, Minnesota, Ohio

3.4.5 Nitrogen

The nitrogen species in sludge represents a source of groundwater pollution [11]. Due to the many mechanisms associated with nitrogen movement, it is difficult to predict the risk of pollution. The potential for groundwater pollution is significantly affected by the total quantity of nitrogen present and the species, which include nitrogen, ammonia, nitrate, and nitrite. Generally, nitrate is the principal species of concern and is relatively mobile in most soil types. Aerobic conditions facilitate microbial conversion of other nitrogen species to nitrate, and thus, increase the possibility for nitrogen movement. Therefore, disposal methods providing anaerobic conditions inhibit nitrogen movement and allow microbial destruction of pathogens [11].

3.5 Suitability of Sludge for Landfilling

In determining the suitability of sludge for landfilling, a determination should be made of the sludge sources and treatment. Analyses should also

Percent or mg/kg oven-dry solids basis.

Standard deviation as a percentage of mean. Number of samples on which this is based may not be the same as for other columns.

APPENDIX B
List of Agencies Contacted

SOURCES CONTACTED FOR THE NYSDEC PHASE II INVESTIGATION AT ATLANTIC ASBESTOS

New York State Department of Environmental Conservation

Hazardous Waste Remediation

Region 3

21 South Putt Corners Road

New Paltz, NY 12561

(914) 255 5453

Contact: Franc Graber

Date:

9/28/89

Information Gathered: File search for the site.

United States Department of the Interior

Geological Survey

Water Resources Division

P.O. Box 1669

Albany, NY 12201

(518) 472 3107

Contact: Lloyd A. Wagner

Date:

9/20/89

Information Gathered: USGS Publications for Dutchess County.

New York State Department of Health

Nelson A. Rockefeller Empire State Plaza

Corning Tower Building

Albany, NY 12237

Contact: James Covey, P.E.

(518) 474 2121

Date:

9/20/89 and 11/8/89

Information Gathered: Community Water Supply Atlas.

Department of Soil and Water Conservation

Dutchess County

P.O.Box 37

Route 44

Millbrook, NY 12545

(914) 677 8011

Date:

9/20/89

Information Gathered: Soil Survey of Dutchess County.

Dutchess County Department of Health

22 Market Street

Poughkeepsie, NY

(914) 431 2044

Date:

9/28/89

Information Gathered: File search for the site.

New York State Department of Health

Room # 205

2 University Place

Albany, NY 12203

(518) 458 6310

Contact: Joseph Crua

Date:

10/23/89

Information Gathered: File search for the site.

New York State Department of Environmental Conservation

Division of Hazardous Waste Remediation

50 Wolf Road

Albany, NY 12233

(518) 457 0639

Contact: Mike Komoroske

Date:

10/23/89

Information Gathered: File search for the site.

New York State Department of Environmental Conservation

Department of Regulatory Affairs

Region 3

21 South Putt Corners Road

New Paltz, NY 12561-1696

(914) 255 5453

Contact: Cindy L. Ioanna

Date: 9/26/89

Information Gathered: Freshwater wetlands within 3-mile radius of the site.

U.S. Environmental Protection Agency

Region II

26 Federal Plaza, Room 900

New York, NY 10278

(212) 264 6696

Contact: Ben Conneta

Date: 9/20/89

Information Gathered: No files/information.

New York State Department of Environmental Conservation

Division of Water

50 Wolf Road

Albany, NY 12233

(518) 457 6674

Contact: Colbey Tucker

Date: 11/8/89

Information Gathered: No information.

New York State Department of Environmental Conservation

Region 3

Division of Wild Life

21 South Putt Corners Road

New Paltz, NY 12561-1696

(914) 255 5453

Contact: Glenn Cole
Date: 11/8/89

Information Gathered: Federally endangered species of critical habitats within

1-mile radius of the site.

Information Services Specialist

U.S. Department of Commerce

Bureau of the Census

Jacob K. Javits Federal Building

26 Federal Plaza, Room 37-100

New York, NY 10278

(212) 264 4730

Contact: Margaret Padin-Bialo

Date: 11/8/89

Information Gathered: Census maps and census tract counts for Poughkeepsie.

District Technician

Dutchess County Soil and Water Conservation District

Farm and Home Center Building

Route 44, P.O. Box 37

Millbrook, NY 12545

(914) 677 8011

Contact: Mary Binder

Date: 11/8/89

Information Gathered: Air photo maps, farmland/agriculture land within 3-mile

radius of the site.

Significant Habitat Unit

Information Services

Wildlife Resource Center

New York State Department of Environmental Conservation

Delmar, NY 12054

(518) 439 8014

Contact: Burrell Buffington

Date: 11/8/89

Information Gathered: Critical habitats of endangered species within one mile

radius of the site.

Foreman

Department of Water Village of Red Hook Red Hook, NY 12571

Contact: John Imperato

Date: March 7, 1990

Information Gathered: Water purchases made by drilling sub-contractor during

work at Red Hook.

APPENDIX C BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

DATE	2-19-90
	3-01-90

YEC, INC.

HOLE NO. CW-1
SURFACE ELEV 292.03'
G.W. DEPTH 271.25'

SUBSURFACE LOG

PROJECT Atlantic Asbestos #314019

Upper Red Hook
Dutchess County, NY

7				BLOWS OF		
DEPIN-FT	CORE INTERVAL	SALPLE	SAWALE NO	SAMPLE!	l l	NOTES
	0-6" 4.5' to 7.5' 7.5' to 12.5' to 17.5' to 22.5' RCV-4.5' 22.5' to 27.5' RCV-5'				Highly weathered gr shale w/qtz. veins. Fragmented and mixed with br sd and si w/little gravel. 6"-4.5" Highly weathered gr shale w/qtz veins. 4.5'-7.5' highly weathered gr shale w/qtz. veins. Br weathered fracture surfaces and hollow weathered pockets around qtz. contacts w/shale. Last 5" more competent. RQD = 13% 7.5'-12.5' Gr shale w/qtz. veins ,less weathered. Br-rust colored weathered fracture surfaces. Last 3" grades into bl-gr organic rich shale. Less weathered. RQD= 62% 12.5'-17.5' Gr-bl organic rich shale w/qtz veins. Highly weathered and fractured. RQD = 39% 17.5'-22.5' Gr shale w/qtz veins. Fracture surfaces brown and weathered. First 3' of core very competent but rest highly weathered and fractured. RQD = 56% 22.5'-27.5' Gr-bl organic rich shale w/qtz. veins w/br weathered fracture surfaces. RQD = 25% Bottom of boring at 28 feet. (27.5-28' rollerbitted)	Bedrock at 0-6". First 3' bored with 5 7/8 rollerbit. 3'-27.5' cored with NX core barrel. 3'-28' also rollerbitted with 3 7/8 rollerbit. All coring and rollerbit-ting advanced with a track mounted drill rig. HNU readings < 1ppm above background.
	-				CLASSIFICATION MJM, YEC INC.	Ш

METHOD OF INVESTIGATION

ASTM D-1586/NX CORE

DATE STARTED	2-6-90
FINISHED	2 2 00

YEC, INC.

HOLE NO. CW-2

SURFACE ELEV 263.60'

G.W. DEPTH 263.08'

SUBSURFACE LOG

PROJECT Atlantic Asbestos
314019

LOCATION Upper Red Hook (T)
Ditchess County, NY

							Directness C	ounty, NY
	14-M1430	LOG BLOWS ON SAMPLER OF 6 12			DESCRIPTION	NOTES		
	1111	0-2	SS	1	1 2	3	RCV-1.5 feet. moist light br. si and sd, tr cl. (0-1.5 feet)	HNU readings < 1ppm above background.
	1111	5-7' 7-9' 9-11'	SSSS	2 3 4	9 38 10 18 41	12 12 14 17 87	RCV-2 feet. 5-6.5' dry,lt br,f-si and sd,loose tr gravel. 6.5-7.0' moist br sd, some si. last 4" saturated S\$#3 (7-9') RCV-1.75' 7-8' dr br si and md gr sd, grading gr cl at 8'. 8-8.75' wet f-sd and si w/some gravel S\$#4 (9-11') RCV5' 9-9.5' f-md gr sd(br) w/ weathered shale (saturated) refusal at 9.5 feet at gr,extremely shale	Borings advanced with a track mounted drill rig using 4.25" ID HSA.
						•	MTM VEY TAY	

GLASSIFICATION MJM, YEC INC.

METHOD OF INVESTIGATION AS'IM D-1586

DATE	2-19-90
	2-21-90

YEC, INC.

SURFACE ELEV 263.71'

G.W. DEPTH 252.03'

SUBSURFACE LOG

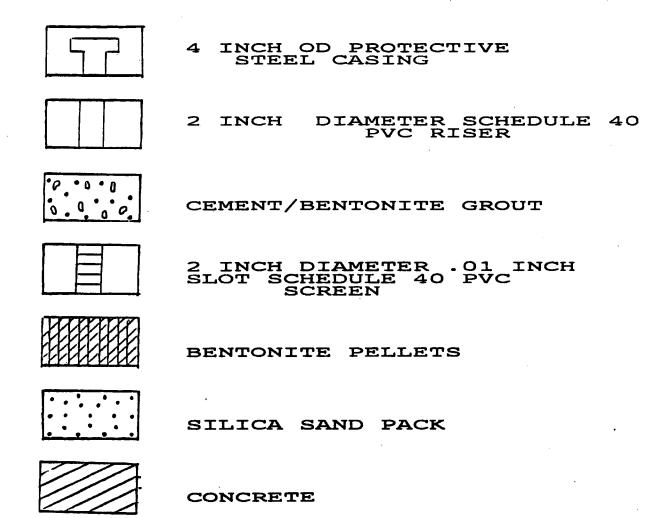
PROJECT Atlantic Asbestos LOCATION Upper Red Hook 314019 Dutchess County, NY Phase II Investigation SAMPLE/ BLOWS ON CORE TOTERVAL DESCRIPTION NOTES 0-2' Dry Br. sd and si, w/some rounded SS pebbles. 4.25" ID HSA Borings advanced with track mounted drill rig. to 5', then a CME-55 5-7' drill rig was used to SS complete the well. Dry Br. f-md sd w/angular shale ss = split spoon sample fragments. 9.5-12.0 Refusal at Bedrock at 10 feet. RCV. - 2.5' gr highly weathered shale w/qtz. veins. Extremely fractured. RQD = 15%12.0-16.5' RCV. - 4.5' RQD = 78Gr highly weathered/fractured shale w/qtz. veins. First 1' (12'-13') composed entirely of weathered qtz. representing a larger qtz. vein. 16.5'-21.01 RCV - 4.5' Gr highly weathered and fractured shale w/ small qtz. veins. RQD = 50%

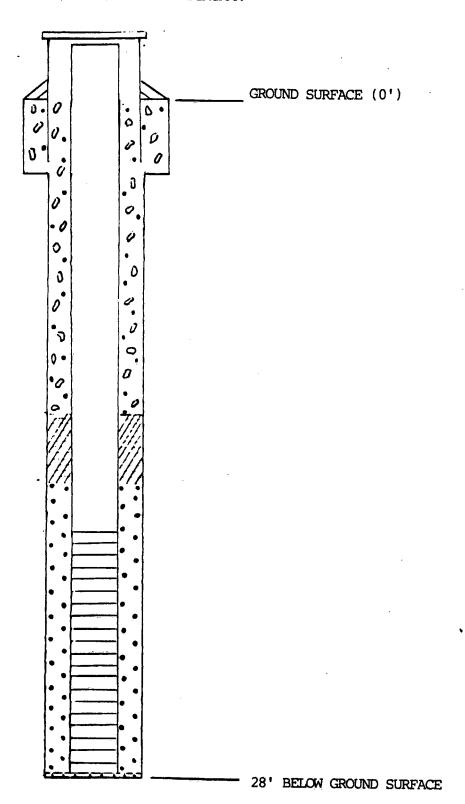
CLASSIFICATION MJM. YEC. INC.

METHOD OF INVESTIGATION

AS'IM D-1586/NX CORE

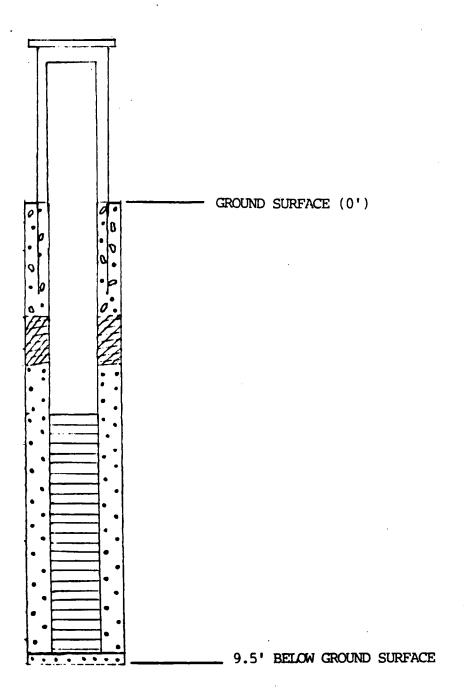
WELL CONSTRUCTION LOG EXPLANATION





ATLANTIC ASBESTOS NYSDEC SUPERFUND SITE PHASE II INVESTIGATION #314019

Vert. Scale: 1"=4'	DRN: MJM
Horiz. Scale: NTS	AP'VD:
YEC, INC. Project #A	0019-8

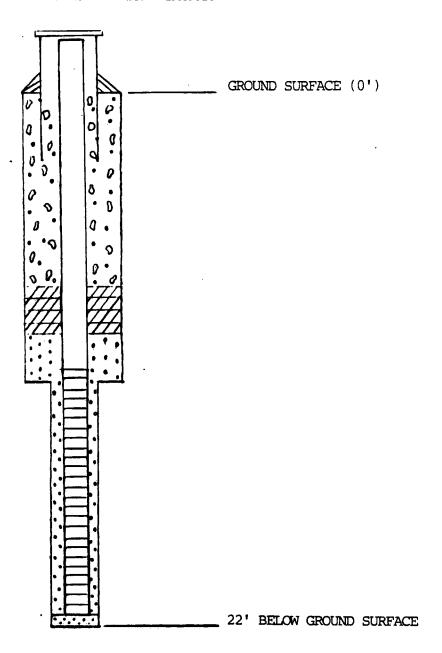


ATLANTIC ASBESTOS NYSDEC SUPERFUND SITE PHASE II INVESTIGATION # 314019

Vert.Scale: 1"=2'	DRN: MJM
Horiz. Scale: NTS	AP'VD:

YEC, INC. PROJECT# A0019-8

GW-3 WELL CONSTRUCTION DIAGRAM



ATLANTIC ASBESTOS NYSDEC SUPERFUND SITE PHASE II INVESTIGATION # 314019

Vert.	Scale:	1"=4'	DRN: MJM
Horiz.	Scale:	NTS	AP'VD:

YEC, INC. PROJECT # A0019-8

APPENDIX D
WELL DEVELOPMENT

APPENDIX D WELL DEVELOPMENT ATALANTIC ASBESTOS

WELL NO.: GW-1

DATE: 03/01/90 ,03/02/90 WEATHER: CLEAR/WARM/40 F DEVELOPMENT METHOD: BAILER

PUMPING RATE (Q): NA

WATER LEVEL IN WELL BEFORE DEVELOPING (FT BGS): 22.36

DEPTH TO BOTTOM OF MONITORING WELL (FT): 28 CALCULATED BOREHOLE VOLUME(GALLONS): 4.15

TOTAL VOLUME EVACUATED (GALLONS): 15

DEVELOPMENT TEAM: KM/TS

BOREHOLE VOLUMES EVACUATED (GALLONS): 3.61

TIME	VOLUME EVACUATED	рН	CONDUCTIVITY (umhos)	TEMP (C)	TURBIDITY (NTU)	COMMENTS
1615	5	7.48	277	9.0	_	
1625	3	-	-	•	_	WATER LEVEL-24.7' BTPVC
1630	1	7.55	273	8.9	>200	WATER CLEARING
1640	1	-	-	-	>200	WATER CLEARING
1645	-	7.64	270	8.9	108	
1655 (03/02/90	5)	7.57	254	8.8	80	
0950	5	7.55	273	8.8	25.5	·
1015	5	7.30	259		35.5	
1037	. 5	7.41	257	9.1 9.2	26.5 14.0	

CALCULATED BOREHOLE VOLUME = .736 x (height of water column(ft)) (borehole diameter = 4.25")

D XICHERRA THEMPOLEVED LIEW SOTEEER DITHALLA

WELL NO .: GW-2

DATE: 02/09/90,02/15/90,02/20/90,02/23/90

WEATHER: -

DEVELOPMENT METHOD: BAILER

PUMPING RATE (Q): NA

WATER LEVEL IN WELL BEFORE PUMPING (FT BGS): .36
DEPTH TO BOTTOM OF MONITORING WELL (FT): B.8
CALCULATED BORSHOLE VOLUME(GALLONS): 6.21
TOTAL VOLUME EMPLOYED (GALLONS): 54.5

DEVELOPMENT TEAM: MM, AK/KM/TS

BOREHOLE VOLUMES EVACUATED (GALLONS): 8.77

TIME	Volume Evacuated	рH	CONDUCTIVITY (unhos)	TEMP (C)	TURBIDITY (NTU)
02/09/90)			· · · · · · · · · · · · · · · · · · ·	
0958	1	-	•	-	> 200
1032	2	-	•	_	>200
1127	2 2	•	=	_	>200
1139		•	-	_	>260
02/15/90				-	>200
0923	2.5	-	•	_	>200
1015	2.5	_	-	_	>200
1113	2.5	-	-	_	>200
1133	2.5	-	-	_	>200
1152	2.5	-	•	_	>200
1208	2.5	•	-	_	>200
02/20/93				=	>200
1311	2.5	_	-	_	
1324	2.5	-	-	-	>200
1337	2.5	-	_	-	>200
1410	-	_		-	>200
1411	2.5	_	_	•	>200
1423	2.5	-	_	-	>200
1438	2.5	_	_	-	>200
1447	2.5	_	_	-	>200
1459	2.5	_	_	-	>200
1413	2.5	_	-	-	>200
1430	2.5	_	_	-	>200
1439	2.5	_	_	-	>200
1555	2.5	_	-	-	>200
1614	2.5	_	• 	-	>200
02/23/90		_	•	-	>200
0942	2.5	7.20	15.		
0945	2.3	7.02	154 188	5.8	198.8
	-	7.04	100	6.5	>200

CALCULATED BOREHOLE VOLUME = .736 x (height of water column(ft)) (borehole diameter = 4.25")

APPENDIX D WELL DEVELOPMENT ATLANTIC ASBESTOS

WELL NO.: GW-3 DATE: 02/28/90

WEATHER: -

DEVELOPMENT METHOD: BAILER

PUMPING RATE (Q): NA

WATER LEVEL IN WELL BEFORE PUMPING (FT BGS): 11.73

DEPTH TO BOTTOM OF MONITORING WELL (FT): 22.0

CALCULATED BOREHOLE VOLUME(GALLONS): 7.56

TOTAL VOLUME EVACUATED (GALLONS): 65

DEVELOPMENT TEAM: KM/AK

BOREHOLE VOLUMES EVACUATED (GALLONS): 8.59

TIME	VOLUME EVACUATED	pН	CONDUCTIVITY (umhos)	?	TEMP (C)		TURBIDITY (NTU)
	START					 	
0833	BAILING	• •	-	-	_	_	-
0855	10	7.15	179		7.2		>200
0920	-	6.65	168		7.2		>200
0930	10	-	-	_	_	-	-
0945	.5	6.64	181		7.2		>200
1000	10	6.90	-		7.2		>200
1015	5	6.94	178		7.3		>200
1030	5	6.97	182		7.3		>200
1045	5	7.20	181		7.2		>200
1100	-	-	-	-	-		54.5/58.6
1120	-	-	 .		-		43.6/38.7
1130	8	6.99	172		7.6		46
1145	7	7.00	178		7.4		-

CALCULATED BOREHOLE VOLUME = $.736 \times (height of water column(ft))$ (borehole diameter = 4.25")

APPENDIX E HYDRAULIC CONDUCTIVITY DATA

LINEAR REGRESSION ANALYSIS FOR SLUG TEST DATA ATLANTIC ASBESTOS GW-1 AND GW-2

r = Correlation coefficient

 $r = Sxy/[Sxx x Syy]^.5$

r can be less than or equal to 1 or greater than or equal to -1.

$$Sxx = \xi \chi^2 - \frac{(\xi \chi)^2}{2}$$

$$SXX = \sum_{i} \chi^{2} - (\sum_{i} \chi)^{2} / (\sum_{i} \chi$$

$$Y = a + bx$$

Coefficient of linear regression equation

$$a = \overline{y} - b\overline{x}$$

 $b = Sxy/Sxx$

x' = (y-a)/b Estimated value of x from that of y. Y' = a + bxEstimated value of y from that of x.

SLUG TEST DATA USED FOR CALCULATIONS

GW-1 FALLING HEAD TEST	r =981 a = .901	T1 = 0	T2 = 90
	b =00868	H1 = .901	H2 = .1197
GW-1 RISING HEAD TEST	r =934 $a = .580$	T1 = 15	T2 = 150
	b =00329	H1 = .530	H2 = .0859
GW-2 FALLING HEAD TEST	r =9418 a = .4548	T1 = 15	T2 = 75
	b =0055	H1 = .3718	H2 = .0398
GW-2 RISING HEAD TEST	r =92 a = .865	T1 = 0	T2 = 90
	b =004	H1 = .8653	H2 = .4993

Location: UPPER RED HOOK, NY

Well No.: GW-1

Reference pt: TOC (PVC)

Test Interval: 3.00 (MIN)

Static Ground Water Level: 24.570 (FT)

Project No: A-0019

Date: 03-02-90

Type of Test: FALLING HEAD

SLUG TEST

TIME (SECONDS)	WATER DEPTH (FEET)	ELEVATION (FEET)	HT (FEET)	HEAD RATIO (HT/HO)
0.000	24.250	-24.250	0.320	1.000
15.000	24.320	-24.320	0.250	0.781
30.000	24.390	-24.390	0.180	0.562
45.000	24.430	-24.430	0.140	0.438
60.000	24.450	-24.450	0.120	0.375
75.000	24.500	-24.500	0.070	0.219
90.000	24.530	-24.530	0.040	0.125
105.000	24.550	-24.550	0.020	0.062
120.000	24.560	-24.560	0.010	0.031
135.000	24.560	-24.560	0.010	0.031
150.000	24.560	-24.560	0.010	0.031

Permeability Equation: $K = (r^2/2L) * {ln(mL/R)} * [{ln(h1/h2)/(t2-t1)}]$

r : standpipe radius (cm.)= 2.540

R: intake point radius (cm.) = 5.398
L: length of intake interval (cm.) = 365.760
t1: time (sec.) for data point 1 = 0.000
t2: time (sec.) for data point 2 = 90.000
H1: head ratio for data point 1 = 0.901
H2: head ratio for data point 2 = 0.120

HYDRAULIC CONDUCTIVITY = 8.34E-04 cm/s

Location: UPPER RED HOOK, NY

Well No.: GW-1

Reference pt: TOC (PVC)

Test Interval: 3.75 (MIN)

Static Ground Water Level:

24.570 (FT)

Project No: A-0019

Date: 03-02-90

Type of Test: RISING HEAD

SLUG TEST

TIME (SECONDS)	WATER DEPTH (FEET)	ELEVATION (FEET)	HT (FEET)	HEAD RATIO (HT/HO)
0.000	25.000	-25.000	-0.430	1.000
15.000	24.850	-24.850	-0.280	0.651
30.000	24.800	-24.800	-0.230	0.535
45.000	24.750	-24.750	-0.180	0.419
60.000	24.700	-24.700	-0.130	0.302
75.000	24.680	-24.680	-0.110	0.302
90.000	24.670	-24.670	-0.100	0.233
105.000	24.650	-24.650	-0.080	0.233
120.000	24.640	-24.640	-0.070	0.163
135.000	24.630	-24.630	-0.060	
150.000	24.620	-24.620	-0.050	0.140
165.000	24.620	-24.620	-0.050	0.116
180.000	24.600	-24.600	-0.030	0.116
195.000	24.600	-24.600	-0.030	0.070
210.000	24.600	-24.600		0.070
225.000	24.600	-24.600	-0.030 -0.030	0.070 0.070

Permeability Equation: $K = (r^2/2L) * \{ln(mL/R)\} * [\{ln(h1/h2\}/(t2-t1)]\}$

r : standpipe radius (cm.)= 2.540

R: intake point radius (cm.)= 5.398
L: length of intake interval (cm.)= 365.760
t1: time (sec.) for data point 1 = 15.000
t2: time (sec.) for data point 2 = 150.000
H1: head ratio for data point 1 = 0.530
H2: head ratio for data point 2 = 0.086

HYDRAULIC CONDUCTIVITY = 5.01E-04 cm/s

Location: UPPER RED HOOK, NY

Well No.: GW-2

Reference pt: TOC (PVC)

Test Interval: 1.75 (MIN)

Static Ground Water Level:

Project No: A-0019

Date: 03-02-90

Type of Test: FALLING HEAD

SLUG TEST

TIME (SECONDS)	WATER DEPTH (FEET)	ELEVATION (FEET)	HT (FEET)	HEAD RATIO (HT/HO)
0.000	3.500	-3.500	0.350	1 000
15.000	3.700	-3.700	0.150	1.000
30.000	3.770	- 3.770	· ·	0.429
			0.080	0.229
45.000	3.790	- 3.790	0.060	0.171
60.000	3.800	-3.800	0.050	0.143
75.000	3.830	-3.830	0.020	0.057
90.000	3.840	-3.840		
105.000			0.010	0.029
103.000	3.850	-3.850	0.000	0.000

3.850 (FT)

Permeability Equation: $K = (r^2/2L) * \{ln(mL/R)\} * [\{ln(h1/h2)/(t2-t1)\}$

r : standpipe radius (cm.)= 2.540

R: intake point radius (cm.)= 5.398 L: length of intake interval (cm.)= 198.120 t1: time (sec.) for data point 1 = 15.000 t2: time (sec.) for data point 2 = 75.000 H1: head ratio for data point 1 = 0.372 H2: head ratio for data point 2 = 0.040

HYDRAULIC CONDUCTIVITY = 2.18E-03 cm/s

Location: UPPER RED HOOK, NY

Well No.: GW-2

Reference pt: TOC (PVC)

Test Interval: 2.75 (MIN)

Static Ground Water Level: 3.850 (FT) Project No: A-0019

Date: 03-02-90

Type of Test: RISING HEAD

SLUG TEST

TIME (SECONDS)	WATER DEPTH (FEET)	ELEVATION (FEET)	HT (FEET)	HEAD RATIO (HT/HO)
0.000 15.000 30.000 45.000 60.000 75.000 90.000 105.000 120.000	4.850 4.490 4.300 4.160 4.060 3.970 3.940 3.890 3.890 3.870	-4.850 -4.490 -4.300 -4.160 -4.060 -3.970 -3.940 -3.890 -3.890 -3.870	-1.000 -0.640 -0.450 -0.310 -0.210 -0.120 -0.090 -0.040 -0.040	1.000 0.640 0.450 0.310 0.210 0.120 0.090 0.040 0.040

Permeability Equation: $K = (r^2/2L) * {ln(mL/R)} * [{ln(h1/h2)/(t2-t1)}]$

r : standpipe radius (cm.)=

R : intake point radius (cm.)= 5.398

L : length of intake interval (cm.)= 198.120 t1 : time (sec.) for data point 1 =

0.000 t2 : time (sec.) for data point 2 = 90.000

H1 : head ratio for data point 1 = 0.865

H2 : head ratio for data point 2 = 0.499

HYDRAULIC CONDUCTIVITY = 3.58E-04 cm/s

APPENDIX F CHEMICAL ANALYTICAL DATA

DATE:

1 May 1990

FILE No. 576028

TO:

Maureen Serafini, NYSDEC

FROM:

William Ahlert, LMS

SUBJECT:

Usability determination for Atlantic Asbestos (L.D.# 314019)

The final report from Data Validation Services concluded that all the results associated with the Atlantic Asbestos site were compliant as submitted. LMS finds all the data from Atlantic Asbestos usable as submitted.

Data Validation Services

P. O. Box 54 Riparius, N. Y. 12862 Phone 518-494-3509

RECEIVED
APR 25 1990
LMS ENGINEERS

Lawler, Accessy a Sk. 19, Engineers

Show. Sucy harry, pata Validation Services & Homey

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Ad. Data Validation of results from Atlantic Aspested Sites Aquated Franect No. 39150 Case ads 20131 and 20174 SDG Nos. 110525 and 11119

Review has been completed for data packages submitted in modition, inc. involving samples collected at the Atlantic Aspestud Argon. Are sampled were round to be in compliance for all parameters, and the reported results correctly reflect the raw data. There were dense metals spike compounds that had results outside of the preferred recovery ranges, and this is indicated in the case harrantwe, and the corresponding forms.

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ATLANTIC ASBESTOS DATA USABILITY REPORT I.D. #314019

The final report from Data Validation Services concluded that all the results associated with the Atlantic Asbestos site were compliant as submitted. LMS finds all the data from Atlantic Asbestos usable as submitted.

ANALYTICAL RESULTS



ENVIRONMENTAL SERVICES
75 Green Movintain Drive. So. Burlington, VT 05-103
TEL. 102/654-1074

NARRATIVE



ENVIRONMENTAL SERVICES
75 Green Mountain Drive, So. Burlington, VT 05403
TEL. 802/656-1074



75 GREEN MOUNTAIN DRIVE, SOUTH BURLINGTON, VERMONT 05403, TELEPHONE (802) 658-1074

March 29, 1990

Y.S. Edward Chen, Ph.D., P.E. YEC, Inc. Forest View Professional Building 10 Pine Crest Road Valley Cottage, NY 10989

Re: Analytical Services Subcontract Aquatec Project No. 89150 Case No. 20374, SDG No. 111156 ETR No's. 20374 and 20380

Dear Dr. Chen:

Enclosed are the results of analyses performed on Atlantic Asbestos site water samples received from YEC, Inc.

The samples were received intact on March 2 and 3, 1990. For the samples received, laboratory numbers were assigned and designated as follows:

YEC Sample No.	Aquatec Sample No.	Aquatec ETR No.	Sample Matrix
MWAA-2 MWAA-3 MWAA-4 Field Blank Trip Blank MWAA-1 SWAA-1 SWAA-2	111156 111157 111158 111159 111168 111169 111170 111171	20374	Water Filtrate Water Water Water Water Water Water
	1111/2		Water

Additional quantities of sample MWAA-2 were submitted to the laboratory for quality control (QC) analysis. Subsamples of MWAA-2 (Lab No. 111156) designated for QC analysis were independently logged into the laboratory for the purpose of internal sample tracking. The QC samples were assigned laboratory numbers 111156MS (matrix spike), 111156MD (matrix spike duplicate), and 111156DP (duplicate).

The matrix spike recoveries for arsenic, lead, and selenium were out of the specified tolerances in the matrix analysis of MWAA-2 (Lab No. 111156MS). The analytical data has been qualified accordingly.

000001

Y.S. Edward Chen, Ph.D., P.E. March 29, 1990 Page 2

An asbestos determination was performed on samples SWAA-1 and SWAA-2 using a modified Total Suspended Solids procedure previously approved by YEC, Inc. The gravimetric test performed measured both asbestos and non-asbestos residue retained on a 0.45 micron filter. The reporting limit for this test is 100 mg/l (<0.01%).

Sincerely,

Joseph K. Comeau Ph.D.

Vice President Chemistry Division

JKC/lam

Enclosure

89150B29MAR90



75 Green Mountain Drive, So. Burlington, VT 05403 TEL. 802/658-1074

ANALYTICAL REPORT

YEC, Inc.

10 Pine Crest Road

Valley Cottage, NY 10989

: 03/28/90 ETR Number: 20374 Project No.: 89150 No. Samples:

Arrived : 03/02/90

Attention : Dr. Y.S. Ed Chen

Page 1

Date

Atlantic Asbestos Waters SDG:111156

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/L unless otherwise noted.

Lab No.		Sample	Description
111156	MWAA-2,	liquid	

1	method No.	Parameter	Result
	120.1	Conductivity (umhos/cm)	291
1	160.1	Total Dissolved Solids	167
	160.2	Total Suspended Solids	306
	410.1	Chemical Oxygen Demand	
	150.1	pH (std. units)	14 6.92
111158	MWAA-3, liquid:		
Į.	120.1	Conductivity (umhos/cm)	202
	160.1	Total Dissolved Solids	292
	160.2	Total Suspended Solids	170
1	410.1	Chemical Oxygen Demand	62
ĺ	150.1	pH (std. units)	11
1		pu (sea. wires)	6.95
111159	MWAA-4, liquid:		
	120.1	Conductivity (umhos/cm)	284
•	160.1	Total Dissolved Solids	
	160.2	Total Suspended Solids	165
}	410.1	Chemical Oxygen Demand	37
	150.1	pH (std. units)	12
		bir (acr. mitts)	6.95

< Last Page >

Submitted By: Neal 2, Van Wyck

Aquatec Inc.

000003



ENVIRONMENTAL SERVICES

75 Green Mountain Drive, So. Burlington, VT 05403 TEL. 802/658-1074

ANALYTICAL REPORT

YEC, Inc.

10 Pine Crest Road

Valley Cottage, NY 10989

: 03/28/90 ETR Number: 20380 Project No.: 89150 No. Samples:

Arrived : 03/03/90

Attention: Dr. Y.S. Ed Chen

Page 1

Date

Atlantic Asbestos Waters SGD:111156

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/l unless otherwise noted.

Lab No.	Sample De	escription	
111170	MWAA-1, Liquid:		
	Method No.	Parameter	Result
	120.1 160.1 160.2 410.1 150.1	Conductivity (umhos/cm) Total Dissolved Solids Total Suspended Solids Chemical Oxygen Demand pH (std. units)	401 234 16 <5 7.35
111171	SWAA-1, Liquid: QSIA 120.1 160.1 160.2 410.1	TSS (0.45 um filtration) Conductivity (umhos/cm) Total Dissolved Solids Total Suspended Solids Chemical Oxygen Demand pH (std. units)	<0.01% 331 191 4.0 11 7.17
111172	SWAA-2, Liquid: QSIA 120.1 160.1 160.2 410.1	TSS (0.45 um filtration) Conductivity (umhos/cm) Total Dissolved Solids Total Suspended Solids Chemical Oxygen Demand pH (std. units)	<0.01% 321 197 110 82 7.00

< Last Page >

Submitted By: Neal E. Vanleyek

Aquatec Inc. 000004

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

b	Name:	Aq	uatec, Inc.		Contract:	89150	_		
Þ	Code:	AQUAI	Case No.	20374	SAS No.:		SDG	No.: _1	11156
W	No.:								
	NO.:	- 	MWAA-2S MWAA-2D MWAA-2 FILTERED MWAA-3 MWAA-4 FIELD BLANK MWAA-1 SWAA-1 SWAA-2		1 -1 -1 -1 -1 -1	Sample ID. 11156 11156MS 11156DP 11157 11158 11159 11168 11170 11171 11172			
er	e ICP	interele	ment correction	ons applied	1?			Yes/No	NO
r	e ICP	backgrou	nd corrections	applied?				Yes/No	YES
	If y appl	es-were : ication	raw data gener of background	correction	:e is?			Yes/No	NO
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Lab Name	: _AOUATEC.	INC.		Contract:	89	150		_ _	P	BW
Lab Code	: _AOUAI	Case	No.:	20374	SAS No.:			SDG	No.:	111156
latrix ((soil/water):	_WA	TER_			Lab S	атр]	le ID:	11	1156PB
Level (Low/med):					Date	Rece	ived:		•
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	CAS				oncentrat				124	
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	17440-					309		,	P	
	7440-					7.1			i P	
	7440-		•			13.3			IP I	
	7440-		•			8.1			IP I	
	7439-					100			I P	
	7439-		•				U	N	F	
				esium		271			IP I	
				anese		2.9			I P	-
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Color B	efore:		c	larity Be	core:			Tex	cure:	
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Comment	::									
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:

Lab Name:AOI			1			
		INORGANIC AN	l Malysis data shee	e r	ı —	EPA SAMPLE N
					ļ	MWAA-2
	UATEC. INC.	Contra	ct: 89150	<u></u>	İ_	riwaa-2
ab Code:AO	VAI_ Case	No.: <u>2037</u>	4_ SAS No.:	· · · · · ·	_ SDG	No.:11115
atrix (soil/w	ater): <u>W</u> A	TER	Lab	Samo	le ID:	111156
		,				•
evel (low/med)): 		Date	Rec	eived:	03/02/90
Solids:	0	.0				
6						
Ca	oncentratio	u nurts (ng/	L or mg/Kg dry w	reigh	t):	ug/L
!		Analyte	Concentration	I C	0	<u>L m</u> i
	7429-90-5	Aluminum	ľ 20200	1	ΙE	P
		Antimony	60.0	l U		F
	7440-38-2		1 10.0	ĮŲ	N	F
	7440-39-3			U		P
		Beryllium_	5.0	U		P
	7440-43-9		5.0	U		P
j	7440-70-2		53200			P
	7440-47-3		23.6			P
	7440-48-4		50.0	U		P
1	7440-50-8	Copper	76.3	1		P
	7439-89-6		L 51700			P
	7439-92-1		17.0	1	N	F
	7439-95-4	Magnesium	12100			P
	7439-96-5	Manganese_	1820			P
	7439-97-6	Mercury	0.2	U		CV
	7440-02-0	Nickel	1 40.0			P
	7440-09-7	Potassium	1 4530	l B		P
i	7782-49-2	Selenium	1/2 1/50.0			F
	7440-22-4	Silver	10.0			_A
		Sodium	1 4120	I B		P
	7440-23-5					_ <u></u> l
	7440-28-0	Thallium		l II l		F
	7440-28-0 7440-62- 2	Vanadium	10.0	U		F
	7440-28-0 7440-62- 2	Vanadium	10.0	U		P
	7440-28-0	Vanadium	10.0	IJ		

ab Name:		INORGANIC AN	1 Alysis dai	A SHEET	•	1-	EPA S	AMPLE NO
	AOUATEC. INC.	Contra	ct:	89150		_ İ_	MWA	A-3
ab Code: _	AOUAI Case	No.:2037	4 SAS No).:		SDO	No.:	111156
strix (soil	L/water):WA	TER		Lab S	amp]	le ID:	111	158
evel (low/	med):			Date	Rec	eived:	03/	02/90
Solids:	0	.0						
	Concentratio	n Units (ug/	L or mg/Kg	dry we	ight	s): _	ug/L	
	CAS No.	Analyte	Concentr	ation	С	0	<u> </u>	
	7429-90-5		1 892			E	P	
	7440-36-0		1. 0.72	60.01	17	<u> </u>		
	•	Antimony	1	60.01		1 17	F	
	7440-38-2		1	10.01	Ü	N	F	
	7440-39-3		1	200			P	
		Beryllium_	 	5.01			P	
	7440-43-9		1 2222	5.0	U		IP	
	7440-70-2		33800				P	
	7440-47-3			10.01			P	
	7440-48-4		ļ	50.01			<u> P </u>	•
	7440-50-8		<u> </u>	25.01	U		<u> P </u>	
	7439-89-6		1040			<u></u>	IP	
	7439-92-1	Lead	1 3.4		В	N	IF	
	7439-95-4	Magnesium	9150	1			<u> P </u>	
	7439-96-5	Manganese	50.5				I P	
	7439-97-6	Mercury	1	0.21	Ù		CV	
	•	Nickel	1	40.01	U		IP i	
	•	Potassium	1	50001	Ü		I P	
	•	Selenium_		5.0			F	
	7440-22-4		1	10.0			A	
	7440-23-5		10000	1			P	
		Thallium		10.0			F	
		Vanadium	1	50.0	_		I P	
			1 20 /	70.0				
	Ĭ.	Zinc_		10.0	77	<u> </u>	<u> P </u>	
	I.—————	Cyanide	1	10.01	U		 	

	MATEC. INC. MAI Gase Lter): WA Case Ca	n Units (ug/	L or mg/Kg	lab : Date	Samp?	le ID:	No.:	111156 1156MS /02/90
Matrix (soil/wa Level (low/med) I Solids: Co	CAS No. 7429-90-5	n Units (ug/	L or mg/Kg	Lab Date	Rece	le ID:	03,	1156MS
Level (low/med) Z Solids: Co	CAS No. 7429-90-5	.0 n Units (ug/ Analyte Aluminum	Concentra	Date	Rece	eived:	03,	•:
X Solids: Co	CAS No. 7429-90-5	n Units (ug/ Analyte Aluminum	Concentra	dry w		,		/02/90
co !	CAS No. 7429-90-5	n Units (ug/ Analyte Aluminum	Concentra		eight	:): 1	1 <i>d</i> /T	
	CAS No. 7429-90-5 7440-36-0	Analyte Aluminum	Concentra		eigh	:):	1 <i>#</i> /7	
	7429-90-5 7440-36-0	Aluminum_				· · · —		
	7429-90-5 7440-36-0	Aluminum_			1 0		<u> </u>	
	7440-36-0		1.18700	ICLOR	С	E E	P	
ь		Antimony	1 75.7			E	F	
	/440-38-7	Arsenic	1 10.3		<u> </u>	N	F	
	7440-39-3		2110				P	•
	7440-41-7		49.0				P	
	7440-43-9		50.8				P	. •
	7440-70-2		1				NR	
	7440-47-3		205				P	
		Cobalt	511				P	
•		Copper	315				P	
j	·	Iron	1 44400				P	
į	7439-92-1	Lead	1_50.1			N	F	•••
Ī	7439-95-4	Magnesium_	1				NR	
j	7439-96-5	Manganese	2260				P	
		Mercury	1.0		i		CV	
		Nickel	507			i	Ρ̈́	
İ	7440-09-7	Potassium					NR	
	7782-49-2			10.0	Ü	N,W		
. 1	7440-22-4	Silver	50.1		i		A	
1	7440-23-5	Sodium					NR	
İ	7440-28-0	Thallium	38.1			i	F	
1	7440-62-2	Vanadium	505		i	i	P	
· į	7440-66-6	Zinc	742			i	P	
j		Cyanide	107			1	 ¦	
		Cyantos	107					
olor Before: _		Clarity	Before:			Test		
•								
coments:		Clarity			,	ATT	lacts:	
•			<i>:</i>					

		U.S.	EPA - CLP				
		INORGANIC AN	1 ALYSIS DATA SHEET		-		PLE NO.
Lab Name: _AO	_ _	MWAA-2					
Lab Code: _AO	UAI Case	No.:2037	4_ SAS No.:		SDG	No.: _	111156
Matrix (soil/w	ater): WA	TER	Lab S	ample	ID:	111	157
Level (low/med):		Date	Recei	ved:	03/0	2/90
% Solids:		.0 n Units (ug/	L or mg/Kg dry we	ight)	::	ig/L	
	CAS No.	Analyte	Concentration	<u> </u>	0 1	<u>M</u> 1	
	7429-90-5		314	<u> </u>	E	P	
	7440-36-0		60.0	U	-	F	
	7440-38-2		10.0		N,W		
	7440-39-3		200			P	
	•	Beryllium	5.0			P	
•	7440-43-9		5.0			P	
	7440-70-2		57700			P	
	7440-47-3		10.0	U		P	
	7440-48-4		50.0			P	
	7440-50-8		25.0			P	
	7439-89-6		415			P	
	7439-92-1			וט	N.W	· ·	
		Magnesium_	5310	- 0	NW	P	•
		Manganese	15.7				•
•	7439-97-6		0.2	U	<u>_</u>	P CV	
	7440-02-0		40.0			P	•
		Potassium_	5000		 :	P	
			5.0		N	F	
		Selenium	10.0		N .	A	
	7440-22-4		3870	В		P	
	7440-23-5		10.0		W	F	
	7440-28-0 7440-62-2	Thallium	50.0		W	P	
	•	•	27.9			P	
•	7440-66-6	·	27.9			i	
		Cyanide				NR	
Color Before:		Clarity :	Before:			ure:	
Comments:			•				

		0.5.	EFA - CL	5		
		TWODGANTO	1	B. 411228		EPA SAMPLE NO
	•	INORGANIC AN	MALYSIS DA	TA SHEET	!	
Lab Name: _A	OUATEC. INC.	Contra	ict:	89150		MWAA-2D
Lab Code:A	OUAI Case	No.: 2037	4 SAS N	o.:	SD	G No.:111156
Matrix (soil/	Sentar): UA	TED		Tab Cai	1. PD	. 111156DD
.mcrtz (3011)				تهد تيميا	mbre In	111156DP
Level (low/me	d):			Date R	eceived	03/02/90
	_					
% Solids:	0	1.0				
	Concentratio	n Units (ug/	L or mg/K	g dry weig	zhe):	ug/L
	CAS No.	Analyte	Concent	ration	- 0	<u> </u>
	7429-90-5		1 21300		E	<u> P </u>
		Antimony		60.01 t		<u> F </u>
	17440-38-2			10.01		 1
	17440-39-3			2001 (<u> P </u>
		Beryllium_		5.0] [I P
	7440-43-9		1 62000	5.01 1	<u> </u>	<u> P </u>
	7440-70-2		53900			1 <u>P</u>
	7440-47-3		21.3	50.01		P
	7440-48-4		1 75 0	50.01 t	<u>'</u>	<u> P </u>
	7440-50-8		1 75.0			<u> P </u>
	7439-89-6 7439-92-1		1 44400			<u> P </u>
		Lead_ Magnesium_	12100		N N	<u> F </u>
		Manganese_	1 1750			1 P
	7439-97-6		1 1/30	0.2 1		I P
	7440-02-0					CV
	7440-09-7		1 4990	40.011		P
	7782-49-2		1 4990	50 O I		<u> P</u>
	7440-22-4			50.01		1 F
	7440-23-5	Silver	4410	10.01		A
	7440-28-0		1 4410	10 O : 1		I P
	7440-62-2	Vanadium	 	10.0 U		F
	7440-66-6	Zinc	1 254	30.01		P
	1,440-00-0	Cyanide	1 234	10.01 0		<u> P </u>
•		Cyantide		10.0		! !
)			_ -	
Color Before:		Clarity	Before:		Tev	ture:
Color After:		Clarity		-		
		crarity	WTCEL:		Art	ifacts:
Comments:		•				
	• .		.•			
			•			

		u.s.	EPA - CLP				
			1		.•	EPA S	AMPLE NO.
		inorganic ana	LYSIS DAT	A SHEET	Į		
Lab Name: _	ACUATEC. INC.	Contrac	t:	89150		MWA	A-4
Lab Code: _	AOUAI Case	No.:20374	_ SAS No	·:	SD	3 No.:	111156
Matrix (soi	1/water): <u>WA</u>	TER		Lab Sam	ple ID	:1	11159
Level (low/	med):			Date Re	ceived	: <u>03</u> ,	/02/90
		.0					
7 Solids:		<u>. V</u>					
	Concentration	n Units (ug/L	or mg/Kg	dry weig	ht): _	ug/L	
	CAS No.	Analyte	Concentr	ation C	1 0	LMI	
	7429-90-5		1000		E	I P	
	7440-36-0			60.01 t	1	F	
	7440-38-2			10.0	JIN	F	•
	7440-39-3			2001	J	I P	
	•	Beryllium_		5.0 0	J	P	
	7440-43-9	• •		5.01	J	P	
	7440-70-2		33800		1	P	
	7440-47-3	•		10.0	J į	I P	
	7440-48-4	-		50.01	J	IP	
	7440-50-8			25.0	J	P	
	7439-89-6		1070	1	1	J P	
	7439-92-1		3.0		BN	F	
	•	Magnesium	9220	Ĺ	j	P	_
	•	Manganese	38.6		<u> </u>	1 P	, -1.
	7439-97-6			0.2	ו ט	CV	
	7440-02-0			40.01	ו ני	I P	
	•	Potassium		5000	ן נ	I P	
	7782-49-2			5.0	אן ט	F	
	7440-22-4			10.0	Ú	Į Å	
	7440-23-5		10200	1	1.	P	
	•	Thallium	1	10.0	UW	F	
	•	Vanadium		50.0	ן ט	I P	
	7440-66-6	•	22.3		1	I P	•
	# -	Cyanide	1	10.0	ן ט	I	
••					1		
	• • • • • • • • • • • • • • • • • • •					·	
Color Befor	re:	Clarity	Before: _		Te	XULTE:	
Color After	t:	Clarity	After: _		Ar	tifacts	B:
Commencs:							
-			••				

Lab Name:AOI Lab Code:AOI Matrix (soil/wa			ect:891	£Λ	i	FIEL) BLANK
Lab Code:AO				<u> </u>			
	VAI Case	W 000					
Matrix (soil/w		No.:203	SAS No.:		_ SDO	No.:	11115
	ater): <u>WA</u>	TER	I	ab Samp	le ID:		1168
Level (low/med)): <u> </u>		מ	ate Rec	eived:	03,	/03/90
% Solids:	0	.0					
c	oncentratio	n Maiss (wa	/T am ma // am	<i>-</i>	> .	-	
	Officeret	u ource (ag	L or mg/Kg dr	A mergu	E):	ug/L	
	CAS No.	Analyte	Concentrati	on C	0	1 14 1	
		Aluminum	434		E	IP	
		Antimony	1 6	บ 10.0		j r	
	7440-38-2		1	Û 0.C	N	F	
	7440-39-3			200 U		IP	
		Beryllium_		5.0 U		P	
	7440-43-9			5.0 U		P	
	7440-70-2		5	000 U		IP	
	7440-47-3	Chronium	1 10	บ 10.0		ĮP į	
,	7440-48-4	Cobalt	50	0.0 0		IP	
!	7440-50-8			5.0 U		P	
	7439-89-6		1 651			P	
	7439-92-1			5.0 บ	N,W	F	
	7439-95-4	Magnesium_		U 1000		<u> P</u>	
		Manganese_	1 26.6			IP	
i		Mercury	<u> </u>	0.2 U	1	CV	
!	7440-02-0		4.0	0.0 U	<u> </u>	I P	
		Potassium_	5(000 บ		IP	
	7782-49-2			5.0 U	N.	F	
	7440-22-4		1 10	0.0		A	
	7440-23-5		5(000 U		IP	
	7440-28-0	Thallium	10	ט ו 0.0		F	
+	7440-62-2	Vanadium	5(U 10.0		IP i	
	7440-66-6	Zinc	2(U 10.0		IP	
·	<u> </u>	Cyanide	1 10	ט 10.0			
	l	<u> </u>					
Color Before:							
color After:		Clarity	After:		Art	ifacts:	
coments:							
			••		_		

Form I - IN

Name: _AC		INORGANIC AN	1 MALYSIS DA	ATA SHEET	ľ	.	EPA SAMPLE N
	DUATEC. INC.	Contra	et:	89150		_	MWAA-1
Code: AC	DUAI Case	No.: 2037	'4 SAS N	ło.:		SDO	No.:11115
	water):WA					_	111170
TY (SOLT)		<u> </u>		<u> </u>	amþ	re in	
l (low/med	i):			Date	Rec	eived:	03/03/90
lids:	0	.0					
(Concentratio	n Units (ug/	L or mg/N	Kg dry we	igh	t): _	ug/L
	CAS No.	Analyte	Concent	Tation	С	1 0	1 4 1
		Aluminum	11120			ΙE	P
	•	Antimony		60.0	U		F
	7440-38-2			10.0	U	l N	Œ
	17440-39-3	•	1	200	U	1	P
	7440-41-7	Beryllium		5.0	ប	Ì	P
	7440-43-9			5.0	Ü	1	IP
	7440-70-2		76800			1	P
	7440-47-3	•	Ī	10.0	Ü	Ī	P
	7440-48-4			50.0	Ü	i	P
	7440-50-8		1	- 25.0	Ü	1	P
	7439-89-6		1 2320			i	P
	7439-92-1		13.2		В	l N	F
	7439-95-4		14160		В	ı	P
		Manganese_	99.3			ī	IP i
	7439-97-6			0.2	U	İ	CV
	7440-02-0		1	40.0		i	IP I
		Potassium_	 	5000		Ì	IP I
	7782-49-2			5.0		W, K	F
	7440-22-4		<u> </u>	10.0		1 24 9 44	IA
	7440-23-5	•	4510	10.0	В		P
•		Thallium		10.0			
		Vanadium_		50.0			F P
	17440-62-2	74ma(1,10m	<u> </u>	20.0			IP
	17440-00-0	Zinc	1	10.0			
		Cyanide		10.0		 	

	INORGA		l LLYSIS DAT	A SHEET				<u>mple no</u> AA-1
ab Name: _AOUATE	C. INC.	Contrac	st:	89150		i_		
ab Code: _AOUAI	_ Case No.:	20374	SAS No	.:		SDG	No.: _	11115
atrix (soil/water): WATER			Lab S	Запр	Le ID:	111	171
evel (low/med):				Date	Rece	eived:	03,	03/90
Solids:	0.0							
Conce	ntration Mait	e (ne/1	~~~/V~	رور وحجوار	o de anto e	-\.	··· /7	
	ntration Unit						UE/L	
	S No. Ana		Concentr	ation			<u> </u>	
•	9-90-5 Alumi		612	(0.0		E	P	
	0-36-0 Antin			60.0			IF	
· · · · · · · · · · · · · · · · · · ·	0-38-2 Arser			10.0			F	
•	0-39-3 Bariu		<u> </u>	200			IP	
	0-41-7 Beryl			5.0			P	
•	0-43-9 Cadmi		53100	5.0	U		IP	
	0-70-2 Calci		57100	10.0			P	
	0-47-3 Chron			10.0	Ī		P	
	0-48-4 Cobal			50.0	_		<u> P </u>	
	0-50-8 Coppe		(22	25.0	U	<u> </u>	<u> P </u>	
	9-89-6 Iron_		620	5 0			<u> P</u>	
	9-92-1 Lead_		ELEN	5.0	U	N.W		
	9-95-4 Magne		5450			<u></u>	<u> P </u>	
	9-96-5 Manga		41.9	A 3	7.0		IP	
	9-97-6 Mercu			0.2	_		CA	
•	0-02-0 Nicke			40.0			<u> P </u>	
•	0-09-7 Potas		<u> </u>	5000			<u> P </u>	
•	2-49-2 Selet			5.0		Ŋ	F	
	0-22-4 Silve		1 4400	10.0			IA.	•
	0-23-5 Sodiu 0-28-0 Thall		4490	10.0	В		IP	
	0-62-2 Vanac		<u> </u>	10.0			F	
	0-66-6 Zinc_			50.0			P	
1 /44				20.0			<u> P </u>	
	icyan	.00		10.0	<u> </u>		 	
color Before:		_	Sefore:	10.0		Tex	ture: _	

			J V_				
	<u>-</u>	INORGANIC AN	1 MALYSIS DAT	A SHEE	r	[EPA SAMPLE NO. SWAA-2
ab Name: _AO	UATEC. INC.	Contra	ct:	89150		i.	
ab Code: _AO	<u>UAI</u> Case	No.:2037	<u>'4 </u>	·:		_ SD	C No.:11156
iatrix (soil/w	rater): <u>WA</u>	TER		Lab :	Samp	le ID	111172
Level (low/med	ı):			Date	Rec	eived	03/03/90
K Solids:	0	.0					
d	Concentration	n Units (ug/	L or mg/Kg	dry w	eigh	t): _	ug/L
	CAS No.	Analyte	Concentr	ation	<u> c</u>	10	
	7429-90-5		1920	(0.0	<u> </u>	<u> E</u>	IP I
	7440-36-0		 	60.0	_	1 37	IF
	17440-38-2		 	10.0 200		<u> N</u>	IF P
	17440-39-3	•		5.0		 	IP
•	7440-41-7 7440-43-9		1	5.0		 	IP I
	17440-43-9		1 47500	7.0	1	<u> </u>	IP
	7440-70-2	,	1 47300	10.0	I II	 	IP I
	7440-48-4		<u> </u>	50.0		1	P
	7440-50-8	•	1	25.0			IP .
	7439-89-6		1 3170		1		IP I
	7439-92-1		14.5	· · · · · · · · · · · · · · · · · · ·	В	I N	F
	7439-95-4	•	1 5840		1	1	IP I
	7439-96-5		1 497		İ	i	IP I
	7439-97-6			0.2	II	i	icv i
	7440-02-0			40.0		i	IP I
	7440-09-7		1	5000		1	IP I
	7782-49-2	•	1	5.0		N	iF i
	7440-22-4	•	1	10.0		1	ĪĀ į
	7440-23-5	•	11500		1_	i	IP
	7440-28-0			10.0	Ū	I W	F
	7440-62-2		1	50.0	U	Ī.	IP
	7440-66-6		50.1		L		IP
	İ	Cyanide		10.0	U	1	<u> </u>
• •							
Color Before:		Clarity	Before:			_ Te	Eture:
Color After:	4	Clarity	After: _			_ Ar	tifacts:
Comments:	·		••			<u></u>	

Form I - IN

MWAA-2 ab Name: AQUATEC, INC. Contract: 89150 Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115 Matrix: (soil/water)WATER Lab Sample ID: 111156 Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111156V Level: (low/med) LOW Date Received: 03/02/90 Moisture: not dec.____ Date Analyzed: 03/06/90 Column: (pack/cap) PACK Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L 0 74-87-3-----Chloromethane 10 | 0 74-83-9-----Bromomethane 10 | U 75-01-4-----Vinyl Chloride 10|0 1 75-00-3-----Chloroethane 10 | U 75-09-2-----Methylene Chloride 5 | U 67-64-1-----Acetone 10 | U 75-15-0----Carbon Disulfide 51U 75-35-4----1,1-Dichloroethene 5 | 0 75-34-3-----1,1-Dichloroethane 5 U 540-59-0----1,2-Dichloroethene (total) 5 | U 67-66-3-----Chloroform 5 | U 107-06-2----1,2-Dichloroethane 5 | U 78-93-3----2-Butanone 10 | 0 71-55-6----1,1,1-Trichloroethane 56-23-5-----Carbon Tetrachloride 5 | U 108-05-4-----Vinyl Acetate 5 | U 75-27-4----Bromodichloromethane 10 | U 78-87-5----1,2-Dichloropropane_ 5 | 0 10061-01-5----cis-1,3-Dichloropropene_ 5 | U 79-01-6----Trichloroethene 5 | 0 124-48-1-----Dibromochloromethane 510 79-00-5----1,1,2-Trichloroethane 5|0 71-43-2----Benzene 510 10061-02-6----trans-1,3-Dichloropropene 5 | U 75-25-2----Bromoform 5 | 0 108-10-1----4-Methyl-2-Pentanone 5 0 591-78-6----2-Hexanone 10 | 0 127-18-4----Tetrachloroethene 1010 79-34-5----1,1,2,2-Tetrachloroethane 510 108-88-3----Toluene_ 5 | U 108-90-7----Chlorobenzene 5|0 100-41-4----Ethylbenzene_ 5 | 0 100-42-5----Styrene_ 5 | U 1330-20-7------Xylene (total)_ 5 | U 5 | U

1E VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1		
1	MWAA-2	
1		1

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water) WATER

Lab Sample ID: 111156

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: D111156V

Level: (low/med) LOW

Date Received: 03/02/90

% Moisture: not dec.____

Date Analyzed: 03/06/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
1.75-45-6 2	CHLORODIFLUOROMETHANE	1.10	24	=== BJ
J•				
4. 5.				
6 7.				
8				
0				
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J •				
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9•				
7. 3.		_		
9	*			
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1A VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Na	nme:AQUATEC, I	NC.		Contract	:89150)	i	MWAA	3	
Lab Co	ode: AQUAI	Case N	0.: 20374	SAS No.	:	s	DG	No.:	1111	5
Matrix	: (soil/water) WATER			Lab S	ample	ID:	1111	58	
Sample	wt/vol:	5.0	(g/mL)ML		Lab F	ile ID):	D111	158V	
Level:	(low/med)	LOW			Date	Receiv	ed:	03/	02/9	0
& Mois	ture: not dec				Date	Analyz	ed:	03/	06/9	0
Column	: (pack/cap)	PACK			Dilut	ion Fa	.cto	r:	1	.0
				CONCEN	TRATI	ON UNI	TS:			
D .	CAS NO.	COM	POUND			/Kg) UG			Q	
	74-87-3	Chl	promethane		<u> </u>			10		_!
_ !	74-83-9	Broi	nomethane '			i		10	•	İ
!	75-01-4	Vin	yl Chlorid	e		'i		10	•	1
]	75-00-3	Chl	proethane			i		10	•	1
į	75-09-2	Met	nylene Chl	oride		Ì			Ü	i
	67-64-1	Ace	tone			Ì		10	•	i
	75-15-0	car	on Disulf	ide		1			Ū	j
	75-35-4		-Dichloroe	thene		1			י	ì
n i	75-34-3		-Dichloroe	thane		1			įσ	i
i	540-59-0 67-66-3	Chl	-hicutoroe	thene (tot	:al)	ļ		5	Ĭσ	i
•	107-06-2	1 3-	orororm_]		5	ָו <mark>ַ</mark>	i
. i	78-93-3	2-Ri	-pichioroe	cnane		1		5	טן	İ
i	71-55-6	1 1	1-Trichle			!		10	U	i
• j	20-23-2	ニーニー('スア)	ion Tetreci			!		5	U	Ì
Ì	100-03-4	Vini	71 Acotata			!			שו	- 1
1	/3~2/~4~~~~	RYA	and i ah I awai			!		10		1
	/0-0/-0	1.7.	·Dichloron			1		5		- 1
1	TOOOTLOT		. Zaniahla			!		5		1
1	/ / - OT - O		'n ATAABba-			!		5		.]
!	144-48-1	Dibr	omoohla	- A.L.		!		5		
_ !	/3-00-3	1.1.	フーアア・ストリム・	oethane				5		į
• !	\7-47-7-e-		288					5!		!
ļ	10061-02-6	tran	s-1,3-Dich	loroprope	ne	1		5 5		!
• <u> </u>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		10 f 0 100	_				5		į
. !	108-10-1	4-Me	thyl-2-Pen	tanone				10		ļ
	737-/0-0		Vanona					10		-
• ;	127-18-4	Tetr	achloroeth	ene				5		
_	79-34-5	I,1,	2,2-Tetrac	hloroetha	ne			5		į
	108-90-7		ARA		i			5		i
	100-41-4	CUTO	robenzene_		i			5		i
i	100-42-5	ELDY	roenzene					5		i
ı i	1330-20-7	styr	ene					5 j		i
		yyte	ne (total)		. — <u> </u>			511		I

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TENTATIV	ELY IDENTIFIED COMPOUNDS	
		MWAA-3
Lab Name: AQUATEC, INC.	Contract:89150	Ì

Lab Code: AQUAI Case No.: 20374 SAS No.: SDG No.: 11115

Matrix: (soil/water) WATER Lab Sample ID: 111158

Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111158V

Level: (low/med) LOW Date Received: 03/02/90

% Moisture: not dec.____ Date Analyzed: 03/06/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-45-6 CI	HLORODIFLUOROMETHANE	1.00	26	BJ
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1A VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

	•		1	MWAA-4	
ab Name:AQUATEC,	INC.	Contract:89150	ļ	IIIIII T	
Lab Code: AQUAI	Case No.: 20374	SAS No.:	SDG	No.: 11	115
atrix: (soil/wat	er) WATER	Lab S	ample ID:	111159	
ample wt/vol:	5.0 (g/mL)ML	Lab F	ile ID:	D11115	97
evel: (low/med) LOW	Date 1	Received:	03/02	/90
Moisture: not d	ec	Date 1	Analyzed:	03/06/	/90
olumn: (pack/ca	p) PACK	Dilut	ion Facto	r:	1.0
CAS NO.	COMPOUND	CONCENTRATION (ug/L or ug/			Q
				· · · · · ·	 ,
1 74-87-3	Chloromethane			10 U	i
75-01-4	Vinyl Chloride			10 0	1
75-00-3	Chloroethane	3		10 0	I
75-09-2	Methylene Chlo	ride		10 0	ĺ
67-64-1	Acetone			5 0	
75-15-0	Carbon Disulfi	ide	·	10 0	ļ
l 75-35-4	1 1-Dichloroet	-bono		5 0	Į
/3-34-3	l.l-Dichloroet	hane		5 U	ļ
_ 340-39-0	l.2-Dichloroet	hene (total)		5 Ū	!
0/-00-3	Chloroform			5 Ŭ 5 Ŭ	Į.
107-06-2	1,2-Dichloroet	hane		5 U	ļ
/8-93-3	2-Butanone	· · · · · · · · · · · · · · · · · · ·		10 0	1
1 71-55-6	1,1,1-Trichlor	coethane		5 U	
30-23-5	マニキニー・	lloride_		5 U	[
1 75-27:4	Vinyl Acetate			10 0	i
1 79-97-5	Bromodichloron	ethane		5 0	ł
10061-01-5	1,2-Dichloropr	opane		5 0	ľ
79-01-6	cis-1,3-Dichlo	ropropene		5 เบ	i
124-48-1	Trichloroether	1e		5 บั	·i
79-00-5	Dibromochlorom	ethane		5 U	i
71-43-2	Benzene	coethane		5 J U	i
10061-02-6	trans-1,3-Dich			5 j ប	i
/3-23-2	ドアハカハドハンm	 :		5 U	i
108-10-1	4-Methy1-2-Den	tanono		5 U	ĺ
.				1010	1
127-18-4	Tetrachlorooth	ene		10 0	1
· / / / / / / / / / / / / / / / / / / /	*=====1.1.2.2=Patrad	hloroethane		5 U	ļ
1 700-00-3				5 U	l l
108-90-7	Chlorobeness			5 U	ļ
100-41-4	Fthvlhangana			5 U	Ţ
1 100-42-3	Stvrene			5 U	1
1330-20-7	Xylene (total)			ַ 5 ט	ļ
1 1	- ()			5ן ד	1

1E VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

	MWAA-4	
ı		1

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20374 SAS No.: SDG No.: 11115

Matrix: (soil/water) WATER

Lab Sample ID: 111159

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: D111159V

Level: (low/med) LOW

Date Received: 03/02/90

% Moisture: not dec.____

Date Analyzed: 03/06/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	l Q
1.75-45-6 C	HLORODIFLUOROMETHANE	1.05	23	BJ
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18		!!		
19		<u> </u>		
20.		¦;		
41.				
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23				
26				
27		ii		
28		i		
29		}		
30		1		

EPA SAMPLE NO.

Lab Name: AQUATEC, INC.

Contract:89150

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Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water)WATER

Lab Sample ID: 111168

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: D111168V

Level: (low/med) LOW

Date Received: 03/03/90

Moisture: not dec.____

Date Analyzed: 03/07/90

Column: (pack/cap) PACK

Dilution Factor:

CAS NO.

COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

Q

74-87-3Chloromethane	1	טוט
74-83-9Bromomethane	~ •	טוט
75-01-4Vinvl Chloride	- ·	
/5-00-3Chloroethane		١٥
75-09-2Methylene Chloride	1	סוס
0/-04-1Acetone		S I U
75-15-0Carbon Digulfide		וס
/3-35-41 1-Dichlorooth	4	סופ
/3-34-3		ĺΩ
340-33-0	- ·	וס
0/~00~3~~~~~~~('N \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	- i	טוט
107-06-21,2-Dichloroethan	.[5	וט
/0-73-1	t .	U
/1-55-6	.! 10	שוי
	.! 5	וט
100-03-4Vinvi Acatata	.! 5	שו
/3-2/-4	. 10	Ü
/0-0/-0	5	U
TOOOT_OT_D_======C16=1	1 5	וֹ ד
	. 5	įυ
124-48-1	1 5	i u
79-00-51,1,2-Trichloroethane	1 5	io
71-43-2Benzene	5	iσ
10061-02-6trans-1,3-Dichloropropene		Ū
75-25-2Bromoform	•	iσ
108-10-14-Methyl-2-Pentanone		Ü
591-78-62-Hexanone	10	•
127-18-4Tetrachloroethene	j 10	•
79-34-5		ָ ט
79-34-51,1,2,2-Tetrachloroethane 108-88-3Toluene		Ū
	l _	ָ ט
108-90-7Chlorobenzene		ט
100-41-4Ethylbenzene	ì	_
100-42-5Styrene	'	Ū
1330-20-7Xylene (total)	·	Ŭ
	5	Ŭ

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: AQUATEC, INC.

FIELD BLANK

Contract:89150

Lab Sample ID: 111168 Matrix: (soil/water) WATER

Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111168V

Level: (low/med) LOW Date Received: 03/03/90

% Moisture: not dec.____ Date Analyzed: 03/07/90

Dilution Factor: 1.0 Column: (pack/cap) PACK

CONCENTRATION UNITS:

Number TICs found: 1 (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	HLORODIFLUOROMETHANE	1.10	21	BJ
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EPA SAMPLE NO.

TRIP BLANK Lab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20374 SAS No.: _____ SDG No.: 11115

Lab Sample ID: 111169 Matrix: (soil/water)WATER

Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111169V

Level: (low/med) LOW Date Received: 03/03/90

Moisture: not dec.____ Date Analyzed: 03/07/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L

(-5/ -		Q,
74-87-3Chloromethane	10	טוט
74-83-9Bromomethane		יוט טוט
75-01-4Vinvl Chloride		שוט
/5=00=3======Chloroethane		
75-09-2Methylene Chloride		U
0/-04-lAcetone		U
75-15-0Carbon Disulfide	A	ĮŪ.
75-35-41,1-Dichloroethers		סו
/5-14-3		סו
34U-39-0	7 \	סו
0/~00~)~~~~~~~(n/0r0+0+m	 :	שו
107-06-21 2-Dichloroethans		וט
/8-93-3		שו
71-55-6		וט
- 30743797777777		ען
108-05-4Vinvl 100+0+0	•	U
/3-4/-4		וְע
/8-8/-3		וש
TOOOT_OT_D		ַטן
/ / - U T - O	5	ט
124-48-1	5	ַ ען
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		וס
10061-02-6trans-1 3-Dichle-	5	֝֟֝֓֞֝ ֡
	ne5	ַט
108-10-1A-Mathyl-2-Danas-		וס
		ט
127-18-4		טן
/J~34*3~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		U
	ne! 5	U
108-90-7Chlorob		U
1UU-41-4	5	ט
TUU-42-0	5 j	ָ ט
1330-20-7Xylene (total)	l 5 i	
whiteue (fotal)		,
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VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TRIP BLANK	
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Lab Name: AQUATEC, INC.

Contract:89150

Lab Co	de: AQUA	[Case	No.:	20374	SAS No.:		SDG	No.:	11115
--------	----------	--------	------	-------	----------	--	-----	------	-------

Matrix: (soil/water) WATER

Lab Sample ID: 111169

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: D111169V

Level: (low/med) LOW

Date Received: 03/03/90

% Moisture: not dec._____

Date Analyzed: 03/07/90

Column: (pack/cap) PACK

Dilution Factor:

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
1.75-45-6	CHLORODIFLUOROMETHANE	1.10	9	
2		— <u></u>		 -
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5. 6.		_		!
7				¦
8				
9				
				
12.				
14.				 :
15				
1/				
70.				
19		<u> </u>		
61.				
22		<u>-</u>		
44• <u></u>				
25. 26.				
27.				
20. <u> </u>				
29. 30.				

MWAA-1

ab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Tatrix: (soil/water)WATER Lab Sample ID: 111170

mample wt/vol: 5.0 (g/mL)ML Lab File ID: D111170V

Level: (low/med) LOW Date Received: 03/03/90

Moisture: not dec. ____ Date Analyzed: 03/07/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/L Q

74-87-3Chloromethane		1
74-83-9Bromomethane	' <u>.</u>	טו
75-01-4Vinyl Chloride	•	i u
75-00-3Chloroethane	•	U
75-09-2Methylene Chloride		U
67-64-1Acetone	· .	Ü
75-15-0Carbon Disulfide	•	שו
75-35-41.1-Dichloroethene		l a
75-34-31.1-Dichloroethane	· ·	וס
540-59-01,2-Dichloroethene /total)	4	וט
67-66-3Chloroform		וט
107-06-21.2-Dichloroethane	1	U
78-93-32-Butanone		וט
71-55-61.1.1-Trichloroethans	1	B
30-43-5Carbon Tetrachloride	1	U
108-05-4Vinvl Acetate	4	U
/5-27-4Bromodichloromethano	10	•
/8-8/-51.2-Dichloropropage	•	ען
10061-01-5cis-1,3-Dichloropropene	! 5	U
79-01-6Trichloroethene	<u> </u>	וט
124-48-1Dibromochloromethane	<u> </u>	ט ן
79-00-51,1,2-Trichloroethane	<u> </u>	U
/ 1 - 4) - 2	ï	סן
10061-02-6trans-1.3-Dichlerens-	1 _	טו
/J-2J-2Bromoform	5	ַט
108-10-14-Methyl-2-Pentanone	5	ם
271-/8-02-Heyanone	10	עו
127-18-4Tetrachloroethoro	10	U
/3-34-5	5	ען
	5	שו
108-90-7Chlorobenzeno	5	U
100-41-4Ethvlhenzene	5	U
100-42-5Styrene	5	U
1330-20-7Xylene (total)	5	ט
witere (coral)	5	U
		_

1E VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

S			1
	MWAA-1	L	i
9150	i		·

Lab	Name:	AQUATEC,	INC.

Contract:89150

MWAA-	1

Matrix: (soil/water) WATER

Lab Sample ID: 111170

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: D111170V

Level: (low/med) LOW

Date Received: 03/03/90

% Moisture: not dec._____

Date Analyzed: 03/07/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

CONCENTRATION UNITS: Number TICs found: 1 (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-45-6	CHLORODIFLUOROMETHANE	0.95	14	BJ
4				
5. 6.				
7				
7•				
10.				
12.			· ·	
15.				
16. 17.				7
19				
20.				
22. 23.				
24.				
26				
27.				
29. 30.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'ah	Name: AQUATEC,	TNC ·	Contract:89150	SWAA-1
Jus-	name. Monthe,	INC.	CONCLACT: 89150	

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water)WATER Lab Sample ID: 111171

Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111171V

Level: (low/med) LOW Date Received: 03/03/90

Moisture: not dec.____ Date Analyzed: 03/07/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L Q

74-87-3Chloromethane	10	0
74-83-9Bromomethane		ן ט טו
75-01-4Vinvl Chloride	u	ן ט טו
75-00-3Chloroethane	- :	•
75-09-2Methylene Chloride	~ <u>;</u>	U
67-64-1Acetone	-:	ן ט
75-15-0Carbon Disulfide	_ 10	•
75-35-41.1-Dichloroethene		IU
/5-34-31,1-Dichloroethane	•	וס
34U-39-U1,2-Dichloroethene (total)	- .	וס
6/-66-3Chloroform	- .	U
107-06-21,2-Dichloroethane		ام
/8-93-32-Butanone	- :	שו
71-55-6	_! 10	•
30-43-3Carbon Tetrachloride	- .	U
108-05-4Vinvl Acetate	~ .	וט
75-27-4Bromodichloromethane	_! 10	•
78-87-51,2-Dichloropropane	. 5	U
10061-01-5cis-1,3-Dichloropropene	.! 5	טן
79-01-6Trichloroethene	. 5	ָ עו
124-48-1Dibromochloromethane	.[5	ַ
79-00-51,1,2-Trichloroethane	.! 5	י
71-43-2Benzene	.! 5	שׁ
10061-02-6trans-1,3-Dichloropropene	. 5	U
75-25-2Bromoform	.! 5	U
108-10-14-Methyl-2-Pentanone	.] 5	מ
591-78-62-Hexanone	. 10	U
127-18-4Tetrachloroethene	.] 10	U
79-34-51,1,2,2-Tetrachloroethane	.! 5	U
108-88-3Toluene	. 5	Ū
108-90-7Chlorobenzene	5	ט
100-41-4Ethylbenzene	5	ָ ט i
100-42-5Styrene	5	י ד
1330-20-7Xylene (total)	! 5j	
xyteue (fotal)	1 5	
	Îi	1
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VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SWAA-1	

Lab Name: AQUATEC, INC.

Contract:89150

Matrix: (soil/water)WATER

Lab Sample ID: 111171

Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111171V

Level: (low/med) LOW

Date Received: 03/03/90

% Moisture: not dec._____

Date Analyzed: 03/07/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

CONCENTRATION UNITS: Number TICs found: 1 (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-45-6	CHLORODIFLUOROMETHANE	1.00	23	BJ
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JV.			 !	

EPA SAMPLE NO.

SWAA-2

ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20374 SAS No.: SDG No.: 11115 Matrix: (soil/water)WATER Lab Sample ID: 111172 Fample wt/vol: 5.0 (g/mL)ML Lab File ID: D111172V Level: (low/med) LOW Date Received: 03/03/90 Moisture: not dec.____ Date Analyzed: 03/07/90 Column: (pack/cap) PACK Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L Q 74-87-3-----Chloromethane 10|0 74-83-9-----Bromomethane 10 | U 75-01-4-----Vinyl Chloride 10 | U 75-00-3-----Chloroethane 10 | U 75-09-2----Methylene Chloride 5 | U 67-64-1-----Acetone 10|J 75-15-0-----Carbon Disulfide 5 | U 75-35-4----1,1-Dichloroethene 51U 75-34-3----1,1-Dichloroethane 5 | U 540-59-0----1,2-Dichloroethene (total) 5 | U 67-66-3-----Chloroform 107-06-2----1,2-Dichloroethane 5 | U 5 | U 78-93-3----2-Butanone 10 | U 71-55-6----1,1,1-Trichloroethane_ 56-23-5-----Carbon Tetrachloride 5 | U 108-05-4-----Vinyl Acetate 5 | U 75-27-4-----Bromodichloromethane 10 | 0 78-87-5----1,2-Dichloropropane 5 | U 10061-01-5----cis-1,3-Dichloropropene_ 5 | U 79-01-6----Trichloroethene 5 | U 124-48-1-----Dibromochloromethane 5 | U 79-00-5----1,1,2-Trichloroethane 5|U 5|0 71-43-2----Benzene 10061-02-6----trans-1,3-Dichloropropene 5 | U 75-25-2----Bromoform 5 | U 108-10-1----4-Methyl-2-Pentanone 5 | U 591-78-6----2-Hexanone 10 | 0 127-18-4----Tetrachloroethene 10 | U 79-34-5----1,1,2,2-Tetrachloroethane_ 5 | U 108-88-3----Toluene 5 | U 108-90-7-----Chlorobenzene 2|J 100-41-4----Ethylbenzene_ 5 | U 100-42-5----Styrene_ 5 | U 1330-20-7-----Xylene (total)_ 5 | U 4 | J

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1E VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

- F	i
CWAA-2	:

EPA SAMPLE NO.

Lab	Name	A	QUATEC,	INC.
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Contract:89150

Ì	SWAA-2
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Matrix: (soil/water)WATER

Lab Sample ID: 111172

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: D111172V

Level: (low/med) LOW

Date Received: 03/03/90

% Moisture: not dec._____

Date Analyzed: 03/07/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	 - Q
1.75-45-6 C	HLORODIFLUOROMETHANE	1.00	14	BJ
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Lab Nam	ne:AQUATEC, I	NC.		Contract:	89150		VBL	CM 9	
Lab Cod	le: AQUAI	Case No.	20374	SAS No.:		SDG	No.:	11115	
Matrix:	(soil/water) WATER			Lab Sa	mple ID	: DKM	3002AV	
Sample	wt/vol:	5.0 (g/mL) ML		Lab Fi	le ID:	DKME	3002AV	
Level:	(low/med)	LOW			Date R	eceived	: 00/	00/00	
Moist	ure: not dec	•			Date A	nalyzed	: 03/	06/90	
Column:	(pack/cap)	PACK			Diluti	on Fact	or:	1.0	0
	CAS NO.	601701				N UNITS			
ı	CAS NO.	COMPO	JND	(ug/L	or ug/	Kg) UG/L		Q	
	74-87-3	Chlore	methane				10	l IU	-
ľ	74-83-9	Bromon	ethane -		;			•	!
l 1	75-01-4	Vinvl	Chloride		 ¦			וַט	ļ
	75-00-3	Chlord	ethane					U	ļ
i	75-09-2	Methvl	ene Chlo	ride				טו	Į
• İ	67-64-1	Acetor						וט	ı
1	75-15-0	Carbor	Digulei	do	!			שו	1
■ i	75-35-4	1 1-Di	Chlorott	<u> </u>			5	שו	1
ľ	75-34-3	1,1-D1 1-D1	Jeorge Ide	nene			5	שו	Ì
l i	540-59-0	1,1-Di	chioroeti	nane			5	טן	1
i	67-66-3	Chlore	.cnrordet	nene (tot	aT)[5	טן	Ì
- i	107-06-2	1 1-Di	10Em				5	U	i
. i	78-93-3	1,2-01	curoroet	nane				ַט	i
1	71-55-6	2-Buta	none		1		10	•	i
}	71-55-6	1,1,1-	Trichlor	oethane_				Ū	i
i 1	56-23-5	Carbon	Tetrach:	loride				Ü	-
. .	108-05-4	Vinyl	Acetate_		i		10	•	1
	75-27-4	Bromod	ichlorome	ethane				ט	1
	/0-0/-5	1 フーロイ	Chloren		 ¦				ļ
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				TOLOGENAL	re		5	U	İ
	108-90-7	Ch 1		<u> </u>			5	U	i
·	LUU-41-4	Fthulb					5 j		į.
i	100-42-5		euseue				5		i
l i 1	L330-20-7	scyren	3 7				5		1
		vyteue	(total)_				5		i i
								_	

1E VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

	VBLKN9		

Lab Name:AQUATEC, INC	da	Name:	AOUA	TEC.	INC.
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Contract:89150

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EPA SAMPLE NO.

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water) WATER

Lab Sample ID: DKMB002AV

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: DKMB002AV

Level: (low/med) LOW

Date Received: 00/00/00

% Moisture: not dec._____

Date Analyzed: 03/06/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-45-6	CHLORODIFLUOROMETHANE	1.05	26	J
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EPA SAMPLE NO.

Lab Na	me:AQUATEC,	INC.	Contract:89150	V	BLKP2
Lab Co	de: AQUAI	Case No.: 20374	SAS No.:	SDG No	.: 11115
Matrix	: (soil/wate	r) WATER	Lab Samp	le ID: Di	KMB002DV
Sample	wt/vol:	5.0 (g/mL)ML	Lab File	ID: DI	KMB002DV
Level:	(low/med)	LOW	Date Rec	eived: (00/00/00
& Mois	ture: not de	c	Date Ana	lyzed: (03/07/90
Column I	: (pack/cap)) PACK	Dilution	Factor:	1.0
	63.6 33.6		CONCENTRATION	UNITS:	
	CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	74-87-3	Chloromethane			10/17
_ !	74-83-9	Bromomethane			10 U
	75-01-4	Vinyl Chlorid	e		10 0
]	75-00-3	Chloroethane			10 0
. :	67-64-1	Methylene Chl	oride		5 U
	75-15-0	Carbon Disulf	4.3.		10 0
l i	75-35-4	1,1-Dichloroe	the		5 U
i	/3-34-3] -Dichlarae	thana		5 U
Ì	240-23-0	1.2-Dichloroe	thene (total)		5 0
	01-00-7	('D AYAFAYM	·:		5 0
	107-06-2	1.2-Dichloroe	thane		5 0
. !	/0-73-3				ן טופ
	71-55-6	1,1,1-Trichlo	roethane		3 J
' !		Carbon moterial	<u> </u>		5 U
	100-03-4	Vinvi location			5 U 10 U
	/3=4/=4==== 70=07±E	Bromodichloro	methane		5 U
1	/0-0/-3	1 2-Dichlaran			5 U
. ;	79-01-6	cis-1,3-Dichle	oropropene		5 0
1 1	12 07-0	IT1CD ARAA+ba:			510
1 ;	79-00-5	Dibromochloro	methane		5 0
i	71-43-2	1,1,2-Trichlor	roethane		5 ซี
l i	10061-02-6	trans-1,3-Dick			5 เบ
i	75-25-2	Bromoform	Torobrobene		5 0
1	108-10-1	4-Mathy1-1-Da			5 U
	7717/07077			- :	10 U
l I	12/-18-4	Total language	nene		10 0
i	/7-34-3	1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	chloroethana		זוט ו
					5 U
	108-90-7	===Chloreh			5 U
· I	エリリーチェーチャー	Phirlhanna -			5 U
1	TACA				5 U
!	1330-20-7	Xylene (total)			זוט ו
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1E VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKP2	1
	1

TENTATIVELY IDENTIFIED COMPOUNDS Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water) WATER

Lab Sample ID: DKMB002DV

Sample wt/vol: 5.0 (g/mL)ML

Lab File ID: DKMB002DV

Level: (low/med) LOW

Date Received: 00/00/00

% Moisture: not dec.____

Date Analyzed: 03/07/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

3	HLORODIFLUOROMETHANE			Q
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ab Name: AQUATEC, INC. Contract: 89150 MWAA-2MS

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

atrix: (soil/water)WATER Lab Sample ID: 111156MS

Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111156MSV

mevel: (low/med) LOW Date Received: 03/02/90

Moisture: not dec._____ Date Analyzed: 03/06/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/L

	(ug/L or	ug/Kg)UG/L	Q
 74 - 87-3	Chloromethane		
74-83-9	Bromomethane		סוְט
75-01-4	Vinvl Chloride	· ·	סוֹט
75-00-3	Chloroethane		סום
75-09-2	Methylene Chloride		ola
0/-64-1	Acetone		5 U
75-15-0	Carbon Dieuleide	¥	סוַט
75-35-4	reseal leDichloweethe	<u>!</u>	5 U
/3-14-1	labichloweete		_
340-35-0	/ / /	· •	5 U
0/~00-3	*====(`D: ハアハギハンm	•	סן 5
107-06-2	1.2-Dichloroothane		5 ט
/ 0-73-3	2-Rutanono	•	טן כ
71-55-6	1 1 - Mario hio		טוכ
	PPPPPC3YNAN Maewaaki	_	ט ו כ
	Vinul Access		טוכ
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/070/7070	Persol Jahlanana	!	טופ
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108-10-1	4-Methyl-2-Dente		י סו
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127-18-4			i o i
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108-90-7	enach lanchana		<u>ii</u>
100-41-4	Pthylbones		
エレリーチィッカーーー		_ 5	U
1330-20-7	Xylene (total)		ju j
 •	"Arene (cocal)		וֹ סוֹ
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MWAA-2MSD Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water) WATER Lab Sample ID: 111156MD

Sample wt/vol: 5.0 (g/mL)ML Lab File ID: D111156MDV

Level: (low/med) LOW Date Received: 03/02/90

% Moisture: not dec.____ Date Analyzed: 03/06/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L

74-87-3Chloromethane	10	
74-83-9Bromomethane	10	•
75-01-4Vinyl Chloride	10	
75-00-3Chloroethane	10	•
75-09-2Methylene Chloride		ו וט
67-64-1Acetone	10	1 -
75-15-0Carbon Disulfide		ם ו
75-35-41,1-Dichloroethene	, 	10
75-34-31,1-Dichloroethane		!
540-59-01,2-Dichloroethene (total)	`i	<u>ו</u> ס
67-66-3Chloroform	1	ַס
107-06-21,2-Dichloroethane	: =	סו
78-93-32-Butanone	•	ן ט
71-55-61,1,1-Trichloroethane	10	•
56-23-5Carbon Tetrachloride		ט
108-05-4Vinyl Acetate	•	ן טן
75-27-4Bromodichloromethane	10	•
78-87-51,2-Dichloropropane	. '	ן טן
10061-01-5cis-1,3-Dichloropropene	<u>[</u> 5	ן סן
79-01-6Trichloroethene	5	ן. סו
124-48-1Dibromochloromethane		ll
79-00-5	5	ן ש
79-00-51,1,2-Trichloroethane 71-43-2Benzene	5	ן סן
10061=02=6==============================		1
10061-02-6trans-1,3-Dichloropropene	5	ן "
100-10-1	1 5	ט
108-10-14-Methyl-2-Pentanone	10	ו ס
591-78-62-Hexanone	10	י ד
127-18-4Tetrachloroethene	1 5	י די i
79-34-51,1,2,2-Tetrachloroethane	5	U
108-88-3Toluene	li	i
108-90-7Chlorobenzene		i
100-41-4Ethylbenzene	5	u i
100-42-5Styrene	5 1	'
1330-20-7Xylene (total)	5 1	
		i

ab Name: AQUATEC, INC. Contract: 8	9150	MWAA-2
Lab Code: AQUAI Case No.: 20374 SAS No.:	SDG	No.: 11115
	ab Sample ID:	111156
	ab File ID:	A111156I2S
	ate Received:	03/02/90
	ate Extracted	l: 03/06/90
	ate Analyzed:	03/13/90
PC Cleanup: (Y/N)N pH: D	ilution Facto	or: 1.0
CAS NO. COMPOUND CONCENT	RATION UNITS: r ug/kg)UG/L	· Q
108-95-2	her_	10 U 10
95-95-42,4,5-Trichlorophenol 91-58-72-Chloronaphthalene 88-74-4Dimethylphthalate 208-96-8Acenaphthylene 606-20-22,6-Dinitrotoluene		10 U 50 U 10 U 50 U 10 U
		TOIU I

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

		·	<u> </u>	MWAA-2
Lab	Name: AQUATEC,	INC.	Contract:89150	

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water) WATER Lab Sample ID: 111156

Sample wt/vol: 1003 (g/mL)ML Lab File ID: All1156I2S

Level: (low/med) LOW Date Received: 03/02/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CAS NO. COMPOUND COMP

	(ug/	or ug/kg/oG/L		
99-09-2	3-Nitroaniline		50	U
83-32-9	Acenaphthene	i	10	
51-28-5	2,4-Dinitrophenol		50	
100-02-7	4-Nitrophenol		50	
	Dibenzofuran	i	10	•
121-14-2	2,4-Dinitrotoluene		10	•
84-66-2	Diethylphthalate	i	10	•
7005-72-3	4-Chlorophenyl-phenyl	lether	10	•
86-73-7	Fluorene	- i	10	•
100-01-6	4-Nitroaniline		50	•
534-52-1	4,6-Dinitro-2-methyl	phenol	50	•
86-30-6	N-Nitrosodiphenvlamir	ne (1)	10	•
101-55-3	4-Bromophenvl-phenvle	ether	10	•
118-74-1	Hexachlorobenzene		10	
87-86-5	Pentachlorophenol	 i	50	•
85-01-8	Phenanthrene	·	10	
120-12-7	Anthracene		10	
84-74-2	Di-n-butylphthalate	 ¦	10	
206-44-0	Fluoranthene		10	
129-00-0	Pyrene		10	•
85-68-7	Butylbenzylphthalate	·	10	•
91-94-1	3.3'-Dichlorobenzidir	ne l	20	
56-55-3	Benzo(a)anthracene		10	•
218-01-9	Chrysene		10	
117-81-7	bis(2-Ethylhexyl)phth	nalate	10	
117-84-0	Di-n-octvlphthalate		10	
205-99-2	Benzo(b) fluoranthene		10	
207-08-9	Benzo(k) fluoranthene			
50-32-8	Benzo(a)pyrene		10	
193-39-5	Indeno(1,2,3-cd)pyrer		10	
53-70-3	Dibenz (a,h) anthracene	'e	10	
191-24-2	ereleance (a, ii) ailLineacene		10	
	Benzo(g,h,i)perylene		10	U

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY	IDENTIFIED COMPOUNDS	
ab Name: AQUATEC, INC.	Contract: 89150	MWAA-2
	COULTAGE: 89120	ŀ

Lab Code	e: AQUAI	Case No.:	20374	SAS No.:	SDG No.: 11115
Matrix:	(soil/water) WATER		Lab Sampl	e ID: 111156

Sample wt/vol: 1003 (g/mL)ML Lab File ID: A111156I2S Level: (low/med) LOW Date Received: 03/02/90

Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

PC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CONCENTRATION UNITS: Number TICs found: 0 (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	!
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■ 12		i ———		
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30				

MWAA-3

Lab Name: AQUATEC, INC.

Contract:89150

Matrix: (soil/water)WATER Lab Sample ID: 111158

Sample wt/vol: 1007 (g/mL)ML Lab File ID: All1158I2S

Level: (low/med) LOW Date Received: 03/02/90

% Moisture: not dec. ____ dec. ___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

108-95-2----Phenol 10 U 111-44-4-----bis(2-Chloroethyl)ether 10|U 95-57-8----2-Chlorophenol 10|0 541-73-1----1,3-Dichlorobenzene 10 | 0 106-46-7-----1,4-Dichlorobenzene 10 | 0 100-51-6-----Benzyl alcohol 10|0 95-50-1----1,2-Dichlorobenzene 1010 95-48-7----2-Methylphenol 10|0 108-60-1----bis(2-Chloroisopropyl)ether 10 U 106-44-5----4-Methylphenol 10 | U 621-64-7----N-Nitroso-di-n-propylamine 1010 67-72-1-----Hexachloroethane 10 | U 98-95-3----Nitrobenzene 10|0 78-59-1----Isophorone 10|0 88-75-5----2-Nitrophenol 10 U 105-67-9----2,4-Dimethylphenol 10|0 | 65-85-0-----Benzoic acid 50 | U 111-91-1-----bis(2-Chloroethoxy) methane 10 | U 120-83-2----2,4-Dichlorophenol 10 | 0 120-82-1----1,2,4-Trichlorobenzene 10 | U 91-20-3----Naphthalene 10 | 0 106-47-8----4-Chloroaniline 10|0 87-68-3-----Hexachlorobutadiene 10 U 59-50-7----4-Chloro-3-methylphenol 10|0 91-57-6----2-Methylnaphthalene 10 | U 77-47-4-----Hexachlorocyclopentadiene 10|0 | 88-06-2----2,4,6-Trichlorophenol 10|0 95-95-4-----2,4,5-Trichlorophenol 50 | U 91-58-7----2-Chloronaphthalene 10 | 0 88-74-4----2-Nitroaniline 50 | U 131-11-3-----Dimethylphthalate 10|0 208-96-8-----Acenaphthylene 10|0 606-20-2----2,6-Dinitrotoluene 10|0

ab Name: AQUATEC, INC. Contract: 8	39150	MWAA-3
Lab Code: AQUAI Case No.: 20374 SAS No.:	SDG	No.: 11115
Matrix: (soil/water)WATER	Lab Sample ID:	111158
Sample wt/vol: 1007 (g/mL)ML I	Lab File ID:	A11115812S
	Date Received:	03/02/90
-	Date Extracted	l: 03/06/90
	Dațe Analyzed:	03/13/90
PC Cleanup: (Y/N)N pH:	Dilution Facto	or: 1.0
	TRATION UNITS: or ug/Kg)UG/L	
99-09-2	ol	50 U
(1) - Cannot be separated from Diphenylamin	ne ·	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

	T	ENTATIVELY	IDENTIFIED	COMPOUNDS	
					MWAA-3
Lab	Name: AQUATEC,	INC.	Co	ontract:89150	

Lab Code: AQUAI Case No.: 20374	SAS No.:	SDG No.:	11115
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Matrix: (soil/water)WATER Lab Sample ID: 111158

Sample wt/vol: 1007 (g/mL)ML Lab File ID: All1158I2S

Level: (low/med) LOW Date Received: 03/02/90

% Moisture: not dec. ____ dec. ___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	 RT =	EST. CONC.	Q
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		i	i	

MWAA-4 ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20374 SAS No.: SDG No.: 11115 atrix: (soil/water)WATER Lab Sample ID: 111159 ample wt/vol: 1003 (g/mL)ML Lab File ID: A111159I2S Level: (low/med) LOW Date Received: 03/02/90 Moisture: not dec. ____ dec. Date Extracted: 03/06/90 Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90 PC Cleanup: (Y/N)N pH:____ Dilution Factor: CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L Q | 108-95-2----Phenol 10 | U 111-44-4----bis(2-Chloroethyl)ether 10 | U 95-57-8----2-Chlorophenol 1010 541-73-1----1,3-Dichlorobenzene 10 | 0 106-46-7----1,4-Dichlorobenzene 10 (U 1 100-51-6-----Benzyl alcohol 10 | 0 95-50-1----1,2-Dichlorobenzene_ 10 | 0 95-48-7----2-Methylphenol 10 | U 108-60-1----bis(2-Chloroisopropyl)ether 10 | U 106-44-5----4-Methylphenol 1010 621-64-7----N-Nitroso-di-n-propylamine 10 | U 67-72-1-----Hexachloroethane____ 10 | U 98-95-3----Nitrobenzene 78-59-1-----Isophorone_ 10 | U 10 | U 88-75-5----2-Nitrophenol_ 105-67-9----2,4-Dimethylphenol_ 10|U 10 | U | 65-85-0----Benzoic acid 111-91-1----bis(2-Chloroethoxy)methane 50 | U 120-83-2----2,4-Dichlorophenol_ 1010 10 | 0 120-82-1----1,2,4-Trichlorobenzene_ 10|0 91-20-3----Naphthalene 106-47-8----4-Chloroaniline 10 | 0 87-68-3-----Hexachlorobutadiene 10 | U 59-50-7----4-Chloro-3-methylphenol_ 10|0 91-57-6----2-Methylnaphthalene 10 | 0 77-47-4-----Hexachlorocyclopentadiene_ 10 | 0 88-06-2----2,4,6-Trichlorophenol 1010 95-95-4-----2,4,5-Trichlorophenol_ 10 | U 91-58-7----2-Chloronaphthalene 50 | T 88-74-4----2-Nitroaniline 10 | U 131-11-3-----Dimethylphthalate___ 50 | U 208-96-8-----Acenaphthylene 10|0 606-20-2----2,6-Dinitrotoluene_ 10 | U 10 | U

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water)WATER Lab Sample ID: 111159

Sample wt/vol: 1003 (g/mL)ML Lab File ID: A111159I2S

Level: (low/med) LOW Date Received: 03/02/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:

	(49/	n or ad/yd)og/n		Q
	3-Nitroaniline		50	U
83-32-9	Acenaphthene		10	
51-28-5	2,4-Dinitrophenol	· · · · · · · · · · · · · · · · · · ·	50	•
100-02-7	4-Nitrophenol	**************************************	50	•
132-64-9	Dibenzofuran		10	•
121-14-2	2,4-Dinitrotoluene		10	•
84-66-2	Diethylphthalate	· ·	10	•
7005-72-3	4-Chlorophenyl-phenyl	ether	10	•
86-73-7	Fluorene		10	•
100-01-6	4-Nitroaniline		50	•
534-52-1	4,6-Dinitro-2-methyln	henol	50	•
86-30-6	N-Nitrosodiphenylamin	e (1)	10	•
101-55-3	4-Bromophenyl-phenyle	ther -	10	
118-74-1	Hexachlorobenzene		10	•
87-86-5	Pentachlorophenol		50	•
85-01-8	Phenanthrene		10	•
120-12-7	Anthracene		10	
	Di-n-butylphthalate		10	
206-44-0	Fluoranthene		10	
129-00-0	Pyrene	<u></u>	10	
85-68-7	Butylbenzylphthalate	 {	10	
91-94-1	3,3'-Dichlorobenzidin	<u> </u>	20	
56-55-3	Benzo(a)anthracene	<u> </u>	10	
218-01-9	Chrysene		10	
117-81-7	bis(2-Ethylhexyl)phth	alate	10	•
117-84-0	Di-n-octylphthalate		10	•
205-99-2	Benzo(b) fluoranthene		10	,
207-08-9	Benzo(k) fluoranthene			
50-32-8	Benzo(a) pyrene		10	
193-39-5	Indeno(1,2,3-cd)pyren		10	
53-70-3	Dibenz (a,h) anthracene		10	
191-24-2	Benzo(g,h,i)perylene_		10	
			10	U
1) - Cannot b	o conserved from Dimbours			

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA	SAMPLE	NO
		IN C

ab Name:AQUATEC, INC.	Contract:89150 MWAA-4
ab Code: AQUAI Case No.: 20374	SAS No.: SDG No.: 11115
atrix: (soil/water)WATER	Lab Sample ID: 111159
ample wt/vol: 1003 (g/mL)ML	Lab File ID: All1159I2S
evel: (low/med) LOW	Date Received: 03/02/90
Moisture: not dec dec	Date Extracted: 03/06/90
xtraction: (SepF/Cont/Sonc) SEPF	Date Analyzed: 03/13/90
PC Cleanup: (Y/N)N pH:	Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	l Q
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EPA SAMPLE NO.

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Lab Name: AQUATEC, INC. Contract: 89150

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Lab Code: AQUAI Case No.: 20374 SAS No.: SDG No.: 11115

Matrix: (soil/water)WATER Lab Sample ID: 111168

Sample wt/vol: 1002 (g/mL)ML Lab File ID: All1168I2S

Level: (low/med) LOW Date Received: 03/03/90

% Moisture: not dec._____ dec.____ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH: Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

108-95-2----Phenol 10 | U 111-44-4----bis(2-Chloroethyl)ether 10 | U | 95-57-8----2-Chlorophenol 10 | 0 541-73-1-----1,3-Dichlorobenzene_ 10 | 0 106-46-7----1,4-Dichlorobenzene 10 | 0 100-51-6----Benzyl alcohol 10 | U 95-50-1-----1,2-Dichlorobenzene 10 | U 95-48-7----2-Methylphenol 10|U 108-60-1----bis(2-Chloroisopropyl)ether 10|0 106-44-5----4-Methylphenol 10|U 621-64-7----N-Nitroso-di-n-propylamine 10 | U 67-72-1-----Hexachloroethane 10|U 98-95-3----Nitrobenzene 10|0 78-59-1-----Isophorone 10 | U 88-75-5----2-Nitrophenol 10 | U 105-67-9----2,4-Dimethylphenol____ 1010 65-85-0-----Benzoic acid 50 | U 111-91-1----bis(2-Chloroethoxy)methane 10|0 120-83-2----2,4-Dichlorophenol 10 10 120-82-1----1,2,4-Trichlorobenzene 10 | 0 91-20-3----Naphthalene 10|0 106-47-8----4-Chloroaniline 10|0 87-68-3------Hexachlorobutadiene 10 | 0 59-50-7----4-Chloro-3-methylphenol 10|0 91-57-6----2-Methylnaphthalene 10|U 77-47-4-----Hexachlorocyclopentadiene 10|0 88-06-2----2,4,6-Trichlorophenol 10|U 95-95-4----2,4,5-Trichlorophenol____ 50 | U 91-58-7----2-Chloronaphthalene 10 | U 88-74-4----2-Nitroaniline 50 I U 131-11-3-----Dimethylphthalate 10|0 208-96-8-----Acenaphthylene 10 | U 606-20-2----2,6-Dinitrotoluene 10 | U

FIELD BLANK ab Name:AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

fatrix: (soil/water)WATER Lab Sample ID: 111168

Sample wt/vol: 1002 (g/mL)ML Lab File ID: All1168I2S

Level: (low/med) LOW Date Received: 03/03/90

Moisture: not dec._____ dec.____ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/13/90

PC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO.	СОМРОИИ	(ug/L or ug/Kg)UG/		
99-09-2	3-Nitroanilin	e	50	U
83-32-9	Acenaphthene			שוי
51-28-5	2.4-Dinitronh	enol		•
100-02-7	4-Nitrophenol			טו
132-64-9	Dibenzofuran			מו
121-14-2	2.4-Dinitroto	luene		טן
04-00-2	Dlethv nh+ha	240		ĺΩ
/005-/2-3	4-Chlorophenv	lenhanylathor		ום
00-/3-/	Fluorene	 i		שו
100-01-6	4-Nitroanilin	<u> </u>	10	
534-52-1	4.6-Dinitro-2	- notherland	50	
00-10-0	N-N: ヤツハゥムイ i wb		50	
TOT - 33 - 3	4-8708088681		10	U
	ニニーニーHPY3CNI ヘアヘトヘッ		10	U
87-86-5	Pentachloroph	zene	10	U
85-01-8	Phenanthrene	euo1	50	U
120-12-7	Anthracene		10	U
84-74-2	Di-n-butylpht		10	U
206-44-0	Fluoranthene	nalate	10	បៃ
129-00-0	Franchene		10	•
85-68-7	British bangalak		10	•
91-94-7	3,3'-Dichloro	chalate	10	•
56-55-3	Benzo(a)anthr	benzidine	20	
218-01-0	Chrysene	acene	10	
117-81-7	chrysene		10	
117-81-7	bis(2-Ethylhe:	cyl) phthalate	5	•
			10	
6 U J = J J = Z ====	**************************************		10	
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ray	ree-Tudana/1 a a		10	
			10	
L91-24-2	Benzo(g,h,i)pe	rylene	10	
			10	U
- Cannot b	e separated from [

1F SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

WITHITH COMPOUNDS		
	FIELD BLANK	
Contract:89150		

	_		_			
Lab Code:	AQUAI	Case No.:	20374	SAS No.:	SDG No.:	11115

Matrix: (soil/water) WATER Lab Sample ID: 111168

Sample wt/vol: 1002 (g/mL)ML Lab File ID: A111168I2S

Level: (low/med) LOW Date Received: 03/03/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

Number TICs found: 0

Lab Name: AQUATEC, INC.

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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MWAA-1

ab Name: AQUATEC, INC. Contract: 89150

<u>Lab Code: AQUAI</u> Case No.: 20374 SAS No.: _____ SDG No.: 11115

atrix: (soil/water)WATER

Lab Sample ID: 111170

cample wt/vol: 1004 (g/mL)ML

Lab File ID: All1170I2S

Level: (low/med) LOW

Date Received: 03/03/90

Moisture: not dec. ____ dec. ___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/13/90

PC Cleanup: (Y/N)N pH:____

Dilution Factor:

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg)UG/L

Q

108-95-2Phenol	10	 U
111-44-4bis(2-Chloroethyl)ether	•	Ū
95-57-82-Chlorophenol		טוט
541-73-11.3-Dichlorohenzene		טוט
106-46-71.4-Dichlorobenzene		•
100-51-6Benzvl alcohol	•	U
95-50-11,2-Dichlorobenzene		UU
95-48-72-Methylphenol		וַס
108-60-1bis/2-Chloroisopropyllother		U
TUGT44-34-Methvlphenol	_	וַט
621-64-7N-Nitroso-di-n-propylaming		Ū
67-72-1Hexachloroethane		Ü
98-95-3Nitrobenzene		U
78-59-1Isophorone		וט
88-75-52-Nitrophenol_		U
105-67-92,4-Dimethylphenol	•	ען
65-85-0Benzoic acid		Ü
111-91-1bis(2-Chloroethoxy) methane	<u> </u>	ְ עוּ
120-83-22,4-Dichlorophenol] 10	שו
120-82-11,2,4-Trichlorobenzene	! 10	וט
91-20-3Naphthalene	10	U
106-47-84-Chloroaniline	10	U
87-68-3Hexachlorobutadiene	10	ן ט
59-50-74-Chloro-3-methylphenol	10	U
91-57-62-Methylnaphthalene	10	וס
77-47-4Hexachlorocyclopentadiene	10	U
88-06-22,4,6-Trichlorophenol	10	U
95-95-42,4,5-Trichlorophenol	10	U
91-58-72-Chloronaphthalene	50	ט
88-74-42-Nitroaniline	10	U
131-11-3Dimethylphthalate	50	ַ
208-96-8	10	
208-96-8Acenaphthylene	10	
606-20-22,6-Dinitrotoluene	10	

MWAA-1

Q

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water) WATER Lab Sample ID: 111170

Sample wt/vol: 1004 (g/mL)ML Lab File ID: A111170I2S

Level: (low/med) LOW Date Received: 03/03/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kq)UG/L

99-09-2----3-Nitroaniline 50 | U 83-32-9-----Acenaphthene 10 | U 51-28-5----2,4-Dinitrophenol 50 | U 100-02-7----4-Nitrophenol 50 | U 132-64-9-----Dibenzofuran 10 | U 121-14-2----2,4-Dinitrotoluene 10 | U 84-66-2-----Diethylphthalate_ 10 | U 7005-72-3----4-Chlorophenyl-phenylether 10|U 86-73-7-----Fluorene 10 | U 100-01-6----4-Nitroaniline 50 | U 534-52-1----4,6-Dinitro-2-methylphenol 50 | U 86-30-6----N-Nitrosodiphenylamine (1) 10 I U 101-55-3----4-Bromophenyl-phenylether_ 10 I U 118-74-1-----Hexachlorobenzene 10 | U 87-86-5----Pentachlorophenol 50 | U 85-01-8-----Phenanthrene 10 | U 120-12-7-----Anthracene 10 | U 84-74-2----Di-n-butylphthalate 10 | 0 206-44-0-----Fluoranthene 10 | U 129-00-0-----Pyrene 10 | U 85-68-7-----Butylbenzylphthalate 10 | 0 91-94-1----3,3'-Dichlorobenzidine 20 | 0 56-55-3----Benzo(a) anthracene 10|0 218-01-9-----Chrysene 10|U 117-81-7-----bis(2-Ethylhexyl)phthalate 10 | U 117-84-0-----Di-n-octylphthalate 1010 205-99-2----Benzo(b) fluoranthene_ 10 | U 207-08-9----Benzo(k) fluoranthene 10 | 0 | 50-32-8-----Benzo(a)pyrene 10 | U 193-39-5----Indeno(1,2,3-cd)pyrene 10 | U 53-70-3-----Dibenz(a,h)anthracene_ 10 I U 191-24-2----Benzo(g,h,i)perylene___ 10|0 (1) - Cannot be separated from Diphenylamine

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1F SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

	IENTATIVED	I IDENTIFIED COMPOUNDS	MWAA-1
b	Name: AQUATEC, INC.	Contract:89150	

lab (Code:	AQUAI	Case	No.:	20374	SAS No.	•	SDG	No.:	1111	5
-------	-------	-------	------	------	-------	---------	---	-----	------	------	---

atrix: (soil/water)WATER Lab Sample ID: 111170

Sample wt/vol: 1004 (g/mL)ML Lab File ID: A111170I2S

Level: (low/med) LOW Date Received: 03/03/90

Moisture: not dec._____ dec.____ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

PC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER COMPOUND NAME RT EST. CONC. | Q ------1.123-42-2 |2-PENTANONE, 4-HYDROXY-4-MET| 4.83 8 JBA 11._ 12._ 13.__ 15. 16. 17. 18. 20. 21._ 22._ 23._ 24. 25. 26._ 28. 29._

FORM I SV-TIC

SWAA-1

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water)WATER

Sample wt/vol: 1004 (g/mL)ML Lab File ID: All1171I2S

Date Received: 03/03/90

% Moisture: not dec. _____ dec.___

Level: (low/med) LOW

Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/13/90

Lab Sample ID: 111171

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

Q

108-95-2Phenol	10	 U
111-44-4bis(2-Chloroethyl)ether	10	•
95-57-82-Chlorophenol	10	•
541-73-11,3-Dichlorobenzene	10	•
106-46-71,4-Dichlorobenzene	10	•
100-51-6Benzyl alcohol	10	•
95-50-11,2-Dichlorobenzene	10	• -
95-48-72-Methylphenol	10	• -
108-60-1bis(2-Chloroisopropyl)ether	10	•
106-44-54-Methylphenol	10	, - ,
621-64-7N-Nitroso-di-n-propylamine	10	
67-72-1Hexachloroethane	10	•
98-95-3Nitrobenzene	10	, - ,
78-59-1Isophorone	10	• .
88-75-52-Nitrophenol	10	, ,
105-67-92,4-Dimethylphenol	10	•
65-85-0Benzoic acid	50	, ,
111-91-1bis(2-Chloroethoxy) methane	10	• •
120-83-22,4-Dichlorophenol	10	• •
120-82-11,2,4-Trichlorobenzene	10	. ,
91-20-3Naphthalene	10	
106-47-84-Chloroaniline	10	
87-68-3Hexachlorobutadiene	10	, -
59-50-74-Chloro-3-methylphenol	10	
91-57-62-Methylnaphthalene	10	
77-47-4Hexachlorocyclopentadiene	10	_
88-06-22,4,6-Trichlorophenol	10	•
95-95-42.4.5-Trichlorophenol	50	
91-58-72-Chloronaphthalene	10	•
88-74-42-Nitroaniline	50	
131-11-3Dimethylphthalate	101	
208-96-8Acenaphthylene	101	•
606-20-22,6-Dinitrotoluene	101	•
	: 10 j	1
	· 1	<u> </u>

SWAA-1 ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20374 SAS No.: SDG No.: 11115 Matrix: (soil/water)WATER Lab Sample ID: 111171 Sample wt/vol: 1004 (g/mL)ML Lab File ID: All1171I2S evel: (low/med) LOW Date Received: 03/03/90 Moisture: not dec.____ dec.__ Date Extracted: 03/06/90 Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90 PC Cleanup: (Y/N)N Dilution Factor: pH: CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L Q 99-09-2----3-Nitroaniline 50 | U 83-32-9----Acenaphthene 10 | U 51-28-5----2,4-Dinitrophenol____ 50 | U 1 100-02-7----4-Nitrophenol 50 | U | 132-64-9-----Dibenzofuran 10 U 121-14-2----2,4-Dinitrotoluene 10 | U 84-66-2----Diethylphthalate_ 10 | 0 7005-72-3----4-Chlorophenyl-phenylether 10 | U 86-73-7----Fluorene 10 | U 100-01-6----4-Nitroaniline 50 | U 534-52-1----4,6-Dinitro-2-methylphenol 50 | U 86-30-6----N-Nitrosodiphenylamine (1) 10 | U 101-55-3----4-Bromophenyl-phenylether 10 | U 118-74-1----Hexachlorobenzene 87-86-5----Pentachlorophenol 10 | U 85-01-8-----Phenanthrene 50 | U 120-12-7-----Anthracene 10 | U 84-74-2----Di-n-butylphthalate 10 | U 206-44-0-----Fluoranthene_ 10 | U 10 | 0 129-00-0-----Pyrene 85-68-7-----Butylbenzylphthalate 10 | U 91-94-1----3,3'-Dichlorobenzidine_ 10|U 56-55-3----Benzo(a) anthracene 20 J U 218-01-9-----Chrysene 10 | U 117-81-7----bis(2-Ethylhexyl)phthalate 10 | U 117-84-0----Di-n-octylphthalate 10 | 0 205-99-2----Benzo(b) fluoranthene 10 | U 207-08-9----Benzo(k) fluoranthene 10 U 50-32-8-----Benzo(a) pyrene 10 | U 193-39-5----Indeno(1,2,3-cd)pyrene_ 10 | U 53-70-3-----Dibenz(a,h)anthracene 10 | U

191-24-2----Benzo(g,h,i)perylene___

(1) - Cannot be separated from Diphenylamine

10|U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NTATIVELY	IDENTIFIED COMPOUNDS	
_		SWAA-1
INC.	Contract:89150	i i

Lab	Code: AQUAI	Case No.: 20374	SAS No.:	SDG No.: 11115

Matrix: (soil/water) WATER Lab Sample ID: 111171

Sample wt/vol: 1004 (g/mL)ML Lab File ID: A111171I2S

Level: (low/med) LOW Date Received: 03/03/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg)123-4

Number TICs found: 8

Lab Name: AQUATEC,

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
1.2	2-PENTANONE, 4-HYDROXY-4-MET	4.77	9	===== JAB
2	UNKNOWN	33.45	18	
3	UNKNOWN	35.38		JU
4	UNKNOWN	36.80		J
5	UNKNOWN	36.90	18	•
6	UNKNOWN	38.10	15	•
7.	UNKNOWN	38.48		•
8.	UNKNOWN	39.38	27	•
8. 9.	1	39.30	17	J
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FORM I SV-TIC

1/87 Rev.

ab Name:AQUATEC, INC. Contract:89150	SWAA-2
Lab Code: AQUAI Case No.: 20374 SAS No.: SDG	No.: 11115
Matrix: (soil/water)WATER Lab Sample ID:	111172
Sample wt/vol: 1014 (g/mL)ML Lab File ID:	A111172S
Level: (low/med) LOW Date Received:	03/03/90
Moisture: not dec. <u>dec.</u> Date Extracted	l: 03/06/90
Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed:	03/14/90
PC Cleanup: (Y/N)N pH: Dilution Facto	or: 1.0
CAS NO. COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L	Q
108-95-2	10 U 15 U 15 U 10 U 15 U 10 U 15 U 10 U 15 U 10 U 15 U 10 U 15 U 10 U 10 U 15 U 10 U 10 U 15 U 10 U U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U
95-95-42,4,5-Trichlorophenol 91-58-72-Chloronaphthalene 88-74-42-Nitroaniline 131-11-3Dimethylphthalate	10 U 10 U 49 U 10 U 49 U
606-20-22,6-Dinitrotoluene	10 0

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20374 SAS No.: _____ SDG No.: 11115

Matrix: (soil/water) WATER Lab Sample ID: 111172

Sample wt/vol: 1014 (g/mL)ML Lab File ID: A111172S

Level: (low/med) LOW Date Received: 03/03/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/14/90

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg)UG/L Q

99-09-2----3-Nitroaniline 49 | U 83-32-9----Acenaphthene 10 | U 51-28-5----2,4-Dinitrophenol 49 | U 100-02-7----4-Nitrophenol 4910 132-64-9-----Dibenzofuran 10 | 0 | 121-14-2----2,4-Dinitrotoluene 1010 84-66-2----Diethylphthalate 10 | 0 7005-72-3----4-Chlorophenyl-phenylether 10 | U 86-73-7----Fluorene 10 U 100-01-6----4-Nitroaniline 49 I U 534-52-1----4,6-Dinitro-2-methylphenol 49 | U 86-30-6----N-Nitrosodiphenylamine (1) 10 | U 101-55-3----4-Bromophenyl-phenylether 10 U 118-74-1-----Hexachlorobenzene 10 | U 87-86-5-----Pentachlorophenol 49 | U 85-01-8-----Phenanthrene 10 | U 120-12-7-----Anthracene 10|0 84-74-2-----Di-n-butylphthalate 10 | U 206-44-0-----Fluoranthene 10|U 129-00-0-----Pyrene 10 | U 85-68-7-----Butylbenzylphthalate 10 | U 91-94-1----3,3'-Dichlorobenzidine 20 | U 56-55-3----Benzo(a)anthracene 10 I U 218-01-9-----Chrysene 10 | U 117-81-7----bis(2-Ethylhexyl)phthalate 10 | U 117-84-0-----Di-n-octylphthalate 10 | U 205-99-2----Benzo(b) fluoranthene 10 | U 207-08-9----Benzo(k)fluoranthene_ 10|U | 50-32-8-----Benzo(a)pyrene 10 | U 193-39-5-----Indeno(1,2,3-cd)pyrene 10 | U 53-70-3-----Dibenz(a,h)anthracene___ 10 | U 191-24-2----Benzo(g,h,i)perylene____ 10 | U (1) - Cannot be separated from Diphenylamine

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

SWAA-2	
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ab Name: AQUATEC, INC

Contract:89150

Lab Code: AQUAI Case No.: 20374 SAS No.: _____ SDG No.: 11115

atrix: (soil/water)WATER

Lab Sample ID: 111172

Sample wt/vol: 1014 (g/mL)ML Lab File ID: A111172S

evel: (low/med) LOW

Date Received: 03/03/90

Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/14/90

PC Cleanup: (Y/N)N pH:___

Dilution Factor: 1.0

Number TICs found: 12

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	 Q
1. 2.90-12-0 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29.	COMPOUND NAME UNKNOWN TRIMETHYLBENZENE 1-METHYLNAPHTHALENE UNKNOWN CYCLOHEXENECARBOXYLA UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN	11.02 18.78 29.50 29.95 30.35 32.72 33.47		 J J J J J J J
30				

Lab Name: AQUATEC, INC. Contract: 89150 | SBLKG4

Lab Code: AQUAI Case No.: 20374 SAS No.: _____ SDG No.: 11115

Matrix: (soil/water) WATER Lab Sample ID: AB0306G4I2S

Sample wt/vol: 1000 (g/mL)ML Lab File ID: AB0306G4I2S

Level: (low/med) LOW Date Received: 00/00/00

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0

CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/L

Phenol bis(2-Chloroethyl)ether 2-Chlorophenol 1,3-Dichlorobenzene) a a
bis(2-Chloroethyl)ether 2-Chlorophenol	_ 10	וֹס
2-Chlorophenol		
1.3-Dichlorobenzene		A I TT
		סוס
1.4-Dichlorobenzene		
Benzyl alcohol	- (:	•
-1,2-Dichlorobenzene	- .	•
2-Methylphenol		•
bis(2-Chloroisopropyl)ether	_1 10	•
4-Methylphenol	- .	•
N-Nitroso-di-n-nronylamine	- .	•
Hexachloroethane	- <u>.</u>	•
-Nitrobenzene		•
-Isophorone	- :	, -
-2-Nitrophenol	- ,	•
-2.4-Dimethylphenol		
Benzoic acid		
-bis(2-Chloroethoxy)methane		
-2,4-Dichlorophenol	= <u>^</u>	•
-1.2.4-Trichlorobenzene		
-Naphthalene		
-4-Chloroaniline		
-Hexachlorobutadiene		
-4-Chloro-3-methylphenol		
-2-Methylnaphthalene	- ·	•
-Hexach lorocyclopentadiono	- ·	•
-2.4.6-Trichlorophenol	- <u>.</u>	•
-2.4.5-Trichlorophenol	•	•
-2-Chloronaphthalana	- "1	•
-2-Nitroanilina	- ·	•
-Dimethylphthalate		•
-ACenanhthylene		•
=2.6=Dinitrotolyona		•
-10 pruterocordene	.! 10	וט
	Benzyl alcohol	

EPA SAMPLE NO.

Lab Name:AQUATEC, IN	ic.	Contract:89150) i	PDIMG4	
Lab Code: AQUAI	Case No.: 20374	SAS No.:	SDG	No.: 11	115
Matrix: (soil/water)	WATER	Lab S	Sample ID:	AB0306	G4I2S
Sample wt/vol:	1000 (g/mL)ML	Lab F	File ID:	AB03060	G4I2S
Level: (low/med)	LOW	Date	Received:	00/00,	/00
Moisture: not dec.	dec	Date	Extracted	.: 03/06,	/90
Extraction: (SepF/C	Cont/Sonc) SEP	F Date	Analyzed:	03/13/	/90
PC Cleanup: (Y/N)	и рн:	_ Dilut	ion Facto	r:	1.0
CAS NO.	COMPOUND	CONCENTRATI	ON UNITS:		Q
83-32-9 51-28-5 100-02-7 132-64-9 121-14-2 84-66-2 86-73-7 100-01-6 534-52-1 86-30-6 118-74-1 87-86-5 85-01-8 120-12-7 84-74-2 206-44-0 129-00-0 85-68-7 91-94-1 56-55-3	4-Nitroaniline4,6-Dinitro-2N-Nitrosodiphe4-BromophenylHexachlorobenzPentachlorophePhenanthreneAnthraceneDi-n-butylphthFluoranthenePyreneButylbenzylpht	luene ate l-phenylether emethylphenol enylamine (1) phenylether ene enol chalate denzidine acene		50 U 10 U 50 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U 10 U	
207-08-9 50-32-8 193-39-5 53-70-3 191-24-2	Benzo(b) fluora Benzo(k) fluora Benzo(a) pyrene Indeno(1,2,3-c Dibenz(a,h) anti Benzo(g,h,i) pe	nthene nthene d) pyrene hracene rylene		10 U 10 U 10 U 10 U 10 U 10 U	
-, -, -, -,	separated from D	iphenylamine		——· · ——	 '

1F SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SB	LKG4	1 1
		1

Lab Name:	AQUATEC,	INC.
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Lab	Name: AQUATEC,	INC.	Contract:89150	
Lab	Code: AQUAI	Case No.: 20374	SAS No.:	SDG No.: 11115

Matrix: (soil/water)WATER

Lab Sample ID: AB0306G4I2S

Sample wt/vol: 1000 (g/mL)ML Lab File ID: AB0306G4I2S

Level: (low/med) LOW

Date Received: 00/00/00

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	4.83	15	JA
3	-			
4				
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ab Name: AQUATEC, INC. Contract:89150

MWAA-2MS

Lab Code: AQUAI Case No.: 20374 SAS No.: _____ SDG No.: 11115

Matrix: (soil/water)WATER Lab Sample ID: 111156MS

Sample wt/vol: 1003 (g/mL)ML Lab File ID: B111156MSS

Level: (low/med) LOW Date Received: 03/02/90

Moisture: not dec.____ dec._ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

SPC Cleanup: (Y/N)N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L

| 108-95-2----Phenol 111-44-4----bis(2-Chloroethyl)ether 10 | U 95-57-8----2-Chlorophenol 541-73-1----1,3-Dichlorobenzene 10 | U 106-46-7----1,4-Dichlorobenzene__ | 100-51-6----Benzyl alcohol 1010 95-50-1-----1,2-Dichlorobenzene_ 10 | 0 | 95-48-7----2-Methylphenol 108-60-1----bis(2-Chloroisopropyl)ether_ 10 | 0 106-44-5-----4-Methylphenol 1010 621-64-7----N-Nitroso-di-n-propylamine_ 10 U 67-72-1-----Hexachloroethane 10 | U 98-95-3----Nitrobenzene 78-59-1-----Isophorone_ 10 | U 88-75-5----2-Nitrophenol 10 U 105-67-9----2,4-Dimethylphenol 10 | U 65-85-0----Benzoic acid 10 | 0 111-91-1----bis(2-Chloroethoxy)methane 50 | U 120-83-2----2,4-Dichlorophenol 10 | U 120-82-1----1,2,4-Trichlorobenzene 10 | 0 91-20-3-----Naphthalene 106-47-8----4-Chloroaniline 10|0 87-68-3-----Hexachlorobutadiene 10 | 0 59-50-7----4-Chloro-3-methylphenol_ 10 | U 91-57-6----2-Methylnaphthalene 77-47-4-----Hexachlorocyclopentadiene 10 | 0 88-06-2----2,4,6-Trichlorophenol 10 | U 95-95-4----2,4,5-Trichlorophenol_ 10 | U 91-58-7----2-Chloronaphthalene___ 50 | U

88-74-4----2-Nitroaniline

208-96-8-----Acenaphthylene

131-11-3-----Dimethylphthalate

606-20-2----2,6-Dinitrotoluene_

10 | U

50 | U

10 | 0

10 | 0 10 | U Lab Name: AQUATEC, INC. Contract: 89150 | MWAA-2MS

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

Matrix: (soil/water)WATER Lab Sample ID: 111156MS

Sample wt/vol: 1003 (g/mL)ML Lab File ID: B111156MSS

Level: (low/med) LOW Date Received: 03/02/90

% Moisture: not dec. ____ dec. ___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CAS NO. COMPOUND COMP

			×
99-09-2	3-Nitroaniline		ŤŤ
83-32-9	Acenaphthene		U
51-28-5	2.4-Dinitrophenol	50	
100-02-7	4-Nitrophenol		U
132-64-9	Dibenzofuran	10	77
121-14-2	2.4-Dinitrotoluene		0
84-66-2	Diethylphthalate	10	
7005-72-3	4-Chlorophenyl-phenylether	10 i	
86-73-7	Fluorene	10	
100-01-6	4-Nitroaniline		
534-52-1	4,6-Dinitro-2-methylphenol	50	
86-30-6	N-Nitrosodinhanylamina (1)	\i	
101-55-3	4-Bromophenyl-phenylether	10	
118-/4-1	Hexachlorobenzene		
87-86-5	Pentachlorophenol	10	U
85-01-8	Phenanthrene		77
120-12-7	Anthracene	10	
84-74-2	Di-n-butylphthalate	10	
206-44-0	Fluoranthene	10	
129-00-0	Pyrene	10	U
85-68-7 	Butylbenzylnhthalate		===
91-94-1	3.3'-Dichlorobenzidine	10	
56-55-3	Benzo(a) anthracene	20	
218-01-9	Chrysene	10	
117-81-7	bis(2-Ethylhexyl)phthalate	10	
117-84-0	Di-n-octylphthalate	:	
205-99-2	Benzo(b) fluoranthene	10	
207-08-9	Benzo(k) fluoranthene	10	
50-32-8	Benzo(a) pyrene	10	
193-39-5	Indeno(1,2,3-cd)pyrene	10	
53-70-3	Dibenz(a,h)anthracene	10	
191-24-2	Para (a, n) anthracene	! 10	
	Benzo(g,h,i)perylene	10	U

ab Name: AQUATEC, INC.

Contract:89150

MWAA-2MSD

Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115

fatrix: (soil/water)WATER

Lab Sample ID: 111156MD

Sample wt/vol: 1011 (g/mL)ML

Lab File ID: All1156MD2S

Level: (low/med) LOW

Date Received: 03/02/90

Moisture: not dec. ____ dec. ___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/13/90

PC Cleanup: (Y/N)N

pH:____

Dilution Factor: 1.0

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

108-95-2Phenol		
111-44-4bis(2-Chloroethyl)ether	-	.!
7070/7577777777777	_! 10	U
041-/3-11 3-Dichlorohomes	_	.
TUD-40-/	_! 10	U
TUUTOITOTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT		.
70-00-1		U
JJ-40-/	_! 10	ום
108-60-1bis(2-Chloroisopropyl)ether	_ 10	ען
106-44-54-Methylphenol_	_ 10	Ü
621-64-7N-Nitroso-di-n-propylamine	_ 10	ÌΨ
67-72-1Hexachloroethane	_	j
98-95-3Nitrobenzene	_ 10	Ū
78-59-1Isophorone	_1 10	
88-75-5-	_ 10	•
88-75-52-Nitrophenol	10	•
105-67-92,4-Dimethylphenol	10	•
VJ - UJ - U	49	•
111-91-1bis(2-Chloroethoxy) methane	ž	
	_ 10	
46V US 1 7 /	_ 10	U
JA EV JETTTTTTNANNTNANNTNAN	-	
100-4/-8A-Chloroppiling	_ 10	
0/-08-1	_ 10	•
JJ~3U~/~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	_! 10	U
/ t	- [
	10	U
	_! 10	U
	_ 10	U
	_l 49 j	U
	. 10	Ü
131-11-3Dimethylphthalate	1 49	_
208-96-8	10	
208-96-8Acenaphthylene	101	
606-20-22,6-Dinitrotoluene	•	-
	. 10	U

I MWAA-2MSD

Lab Name: AQUATEC, INC. Contract: 89150

Matrix: (soil/water) WATER

Lab Sample ID: 111156MD

Sample wt/vol: 1011 (g/mL)ML Lab File ID: A111156MD2S

Level: (low/med) LOW

Date Received: 03/02/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/13/90

GPC Cleanup: (Y/N)N

pH:____

Dilution Factor: 1.0

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L

Q

99-09-23-Nitroaniline	49	 77
83-32-9Acenaphthene	47) U
51-28-52,4-Dinitrophenol	49	 -
100-02-74-Nitrophenol	43	1
132-64-9Dibenzofuran	10	************************************
121-14-22.4-Dinitrotoluene	10	0
84-66-2Diethylphthalate	10	
7005-72-34-Chlorophenyl-phenylether	10	•
86-73-7Fluorene	10	•
100-01-64-Nitroaniline	49	•
534-52-14,6-Dinitro-2-methylphenol	49	•
86-30-6N-Nitrosodiphenvlamine (1)	10	
101-55-34-Bromophenyl-phenylether	10	•
118-74-1Hexachlorobenzene		•
87-86-5Pentachlorophenol	10	U
85-01-8Phenanthrene	10	TT
120-12-7Anthracene	10	_
84-74-2Di-n-butylphthalate		
206-44-0Pluoranthene	10 10	
129-00-0Pyrene	10	U
85-68-7Butvlbenzvlphthalate	10	
91-94-13,3'-Dichlorobenzidine	20	
56-55-3Benzo(a)anthracene	10	
218-01-9Chrysene_	10	
117-81-7bis(2-Ethylheryl)nhthalate	•	
117-84-0Di-n-octylphthalate	10	
205-99-2Benzo(b) fluoranthene	10	
207-08-9Benzo(k) fluoranthene	10	
50-32-8Benzo(a) pyrene	10	
193-39-5Indeno(1,2,3-cd)pyrene	10	
53-70-3Dibenz(a,h)anthracene	10	
191-24-2Benzo(g,h,i)perylene	10	
	10	U
1) - Cannot be separated from Diphenylamine		

ab Name: AQUATEC, INC. Contract: 891	MWAA-2
Lab Code: AQUAI Case No.: 20374 SAS No.:	SDG No.: 11115
atrix: (soil/water)WATER Lab	Sample ID: 111156
Sample wt/vol: 1003 (g/mL)ML Lab	File ID:
evel: (low/med) LOW Date	ce Received: 03/02/90
Moisture: not dec dec Date	Ee Extracted: 03/06/90
Extraction: (SepF/Cont/Sonc) SEPF Dat	e Analyzed: 03/10/90
PC Cleanup: (Y/N)N pH: Dil	ution Factor: 1.0
CAS NO. COMPOUND CONCENTRA	TION UNITS: ug/Kg)UG/L Q
319-84-6	0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.10 U 0.10 U 0.10 U 0.10 U 0.10 U 0.5

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MWAA-3 Lab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115 Matrix: (soil/water) WATER Lab Sample ID: 111158 Sample wt/vol: 1005 (g/mL)ML Lab File ID: Level: (low/med) LOW Date Received: 03/02/90 % Moisture: not dec. ____ dec. ___ Date Extracted: 03/06/90 Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/10/90 GPC Cleanup: (Y/N)N pH:____ Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L 0 319-84-6-----alpha-BHC 0.050|U 319-85-7-----beta-BHC 0.050|U 319-86-8-----delta-BHC 0.050|U 58-89-9-----gamma-BHC (Lindane)____ 0.050 U 76-44-8-----Heptachlor 0.050 U 309-00-2-----Aldrin 0.050 | U 1024-57-3-----Heptachlor epoxide 0.050 U 959-98-8-----Endosulfan I 0.050 U 60-57-1-----Dieldrin 0.10 U 72-55-9-----4,4'-DDE 0.10|U 72-20-8-----Endrin 0.10|U 33213-65-9----Endosulfan II 0.10|U 72-54-8-----4,4'-DDD 0.10|U 1031-07-8----Endosulfan sulfate 0.10|0 | 50-29-3----4,4'-DDT 0.10|U 72-43-5-----Methoxychlor 0.50 U | 53494-70-5-----Endrin ketone 0.10 U 5103-71-9----alpha-Chlordane 0.50 | T 5103-74-2----gamma-Chlordane 0.50|U 8001-35-2----Toxaphene 1.0|0 12674-11-2-----Aroclor-1016 0.50 U | 11104-28-2----Aroclor-1221 0.50 U | 11141-16-5----Aroclor-1232 0.50|U 53469-21-9----Aroclor-1242 0.50 U 12672-29-6-----Aroclor-1248 0.50 U 11097-69-1----Aroclor-1254 1.0|U

11096-82-5----Aroclor-1260

1.0|0

ab Name: AQUATEC, INC.	Contract:89150	
Lab Code: AQUAI Case No.: 20374	SAS No.: SDG	No.: 11115
Matrix: (soil/water)WATER	Lab Sample ID:	111159
Sample wt/vol: 1013 (g/mL)ML	Lab File ID:	-
Level: (low/med) LOW	Date Received:	03/02/90
Moisture: not dec dec	Date Extracted	l: 03/06/90
Extraction: (SepF/Cont/Sonc) SEP	F Date Analyzed:	03/10/90
PC Cleanup: (Y/N)N pH:	_ Dilution Facto	or: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L	
319-84-6beta-BHC 319-85-7beta-BHC 319-86-8beta-BHC 58-89-9gamma-BHC (Line 76-44-8	oxide	0.049 U 0.049 U 0.049 U 0.049 U 0.049 U 0.049 U 0.049 U 0.099 U 0.099 U 0.099 U 0.099 U 0.099 U 0.099 U 0.099 U 0.099 U 0.49
12672-29-6Aroclor-1248 11097-69-1Aroclor-1254 11096-82-5Aroclor-1260		

Lab Name: AQUATEC, INC.

Contract: 89150

FIELD BLANK

Contract: 89150

Lab Code: AQUAI Case No.: 20374 SAS No.: SDG No.: 11115

Matrix: (soil/water) WATER

Lab Sample ID: 111168

Sample wt/vol: 1009 (g/mL)ML Lab File ID:

Level: (low/med) LOW Date Received: 03/03/90

% Moisture: not dec.____ dec.___ Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/10/90

GPC Cleanup: (Y/N)N pH:___ Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg)UG/L

319-85-7beta-BHC 319-86-8delta-BHC 58-89-9gamma-BHC (Lindane) 76-44-8	.050 .050 .050	Ū
319-85-7	.050 .050	Ū
319-86-8	.050	•
58-89-9		1 7 7
76-44-8	• • • •	1
309-00-2	.050	•
1024-57-3	.050	• -
959-98-8Endosulfan I 60-57-1Dieldrin 72-55-94,4'-DDE 72-20-8Endrin 33213-65-9Endosulfan II 72-54-84,4'-DDD 1031-07-8Endosulfan sulfate 50-29-34,4'-DDT 72-43-5Methoxychlor 53494-70-5Endrin ketone 5103-71-9Endrin ketone 5103-74-2	.050	•
60-57-1	.050	
72-55-94,4'-DDE 72-20-8Endrin 33213-65-9Endosulfan II 72-54-84,4'-DDD 1031-07-8Endosulfan sulfate 50-29-34,4'-DDT 72-43-5Methoxychlor 53494-70-5Endrin ketone 5103-71-9alpha-Chlordane 5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1212 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242		•
72-20-8Endrin 33213-65-9Endosulfan II 72-54-84,4'-DDD 1031-07-8Endosulfan sulfate 50-29-34,4'-DDT 72-43-5Methoxychlor 53494-70-5Endrin ketone 5103-71-9Endrin ketone 5103-74-2	.099	,
33213-65-9Endosulfan II 00 72-54-84,4'-DDD 00 1031-07-8Endosulfan sulfate 00 50-29-34,4'-DDT 00 72-43-5Methoxychlor 53494-70-5Endrin ketone 00 5103-71-9Endrin ketone 00 5103-74-2	.099	•
72-54-84,4'-DDD 1031-07-8Endosulfan sulfate 50-29-34,4'-DDT 72-43-5Methoxychlor 53494-70-5Endrin ketone 5103-71-9alpha-Chlordane 5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1242	.099	•
1031-07-8Endosulfan sulfate 50-29-34,4'-DDT 72-43-5Methoxychlor 53494-70-5Endrin ketone 5103-71-9alpha-Chlordane 5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	.099	•
50-29-34,4'-DDT 72-43-5Methoxychlor 53494-70-5Endrin ketone 5103-71-9alpha-Chlordane 5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	.099	•
72-43-5Methoxychlor 53494-70-5Endrin ketone 5103-71-9alpha-Chlordane 5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	.099	
53494-70-5Endrin ketone 5103-71-9alpha-Chlordane 5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	.099	•
5103-71-9alpha-Chlordane 5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	0.50	•
5103-74-2gamma-Chlordane 8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	.099	•
8001-35-2Toxaphene 12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	0.50	
12674-11-2Aroclor-1016 11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	0.50	•
11104-28-2Aroclor-1221 11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	0.99	•
11141-16-5Aroclor-1232 53469-21-9Aroclor-1242	0.50	•
53469-21-9Aroclor-1242	0.50	
33469-21-9-1-1242	0.50	•
7677=70=6	0.50	U
12672-29-6Aroclor-1248	0.50	טן
11097-69-1Aroclor-1254	0.99	טן
11096-82-5Aroclor-1260		Ŭ

EPA SAMPLE NO.

Lab Name: AQUATEC, INC. Contract:	89150 MWAA-1
Lab Code: AQUAI Case No.: 20374 SAS No.:	SDG No.: 11115
Matrix: (soil/water)WATER	Lab Sample ID: 111170
Sample wt/vol: 1003 (g/mL)ML	Lab File ID:
Level: (low/med) LOW	Date Received: 03/03/90
Moisture: not dec dec	Date Extracted: 03/06/90
Extraction: (SepF/Cont/Sonc) SEPF	Date Analyzed: 03/13/90
PC Cleanup: (Y/N)N pH:	Dilution Factor: 1.0
	TRATION UNITS: or ug/Kg)UG/L Q
319-84-6	0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.10 U 0.10 U 0.10 U 0.10 U 0.10 U

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SWAA-1 Lab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20374 SAS No.: ____ SDG No.: 11115 Matrix: (soil/water) WATER Lab Sample ID: 111171 Sample wt/vol: 1003 (g/mL)ML Lab File ID: Level: (low/med) LOW Date Received: 03/03/90 % Moisture: not dec.____ dec.___ Date Extracted: 03/06/90 Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/13/90 GPC Cleanup: (Y/N)N pH:__ Dilution Factor: CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/L Q 319-84-6----alpha-BHC 0.05010 | 319-85-7-----beta-BHC 0.050 | U 319-86-8-----delta-BHC 0.050IU 58-89-9-----gamma-BHC (Lindane) 0.050 U 76-44-8-----Heptachlor_ 0.050|0 | 309-00-2-----Aldrin 0.050|U 1024-57-3-----Heptachlor epoxide____ 0.050|U | 959-98-8-----Endosulfan I_ 0.050 U | 60-57-1-----Dieldrin 0.10|0 72-55-9----4,4'-DDE 0.10|0 72-20-8-----Endrin 0.10|U 33213-65-9----Endosulfan II 0.10|U 72-54-8-----4,4'-DDD 1031-07-8----Endosulfan sulfate 0.10|0 0.10|0 50-29-3----4,4'-DDT 72-43-5-----Methoxychlor 0.10|U 0.50 U | 53494-70-5----Endrin ketone 5103-71-9----alpha-Chlordane 0.10|0 0.50 U | 5103-74-2----gamma-Chlordane 0.50|0 | 8001-35-2----Toxaphene 12674-11-2----Aroclor-1016 1.0|0 11104-28-2----Aroclor-1221 0.50 U 0.50 U | 11141-16-5----Aroclor-1232 0.50 U 53469-21-9----Aroclor-1242 0.50 U 12672-29-6----Aroclor-1248 11097-69-1----Aroclor-1254 0.50|U 11096-82-5-----Aroclor-1260 1.0|0

1.0|0

ab Name: AQUATEC, INC.	Contract:89150
Lab Code: AQUAI Case No.: 20374	SAS No.: SDG No.: 11115
Tatrix: (soil/water)WATER	Lab Sample ID: 111172
Sample wt/vol: 1004 (g/mL)ML	Lab File ID:
evel: (low/med) LOW	Date Received: 03/03/90
Moisture: not dec dec	Date Extracted: 03/06/90
Extraction: (SepF/Cont/Sonc) SEPF	Date Analyzed: 03/13/90
PC Cleanup: (Y/N)N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)UG/L Q
319-84-6alpha-BHC	0.050 U
319-85-7beta-BHC 319-86-8delta-BHC	0.050 U
58-89-9	0.050 U
76-44-8Heptachlor	0.050 U
309-00-2Aldrin	0.050 U
1024-57-3Hentachlor end	0.050 U
/ Z = J J = J = = = = = 4 , 4 , = J D D	 ,
33213-65-9Endosulfan II	0.10 U
- /// /1-DDD	
1031-07-8Endosulfan cul	fate 0.10 U
72-43-5Methowichles	0.10 U
Joseph John Later Design Comments of the Comment of	0.50 U
	0.50 U
- OUL-JO-ZTOXADhene	1.0 U
12674-11-2Aroclor-1016	0.50 U
11104-28-2Aroclor-1221	0.50 U
11141-16-5Aroclor-1232	0.50 U
53469-21-9Aroclor-1242	0.50 U
12672-29-6Aroclor-1248	0.50 0
11097-69-1Aroclor-1254	1.00
11096-82-5Aroclor-1260	1.0 U

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: AQUATEC, INC. Contract:	PBLKR3
Lab Code: AQUAI Case No.: 20374 SAS No.:	SDG No.: 11115
Matrix: (soil/water)WATER	Lab Sample ID: PBLKR3
Sample wt/vol: 1000 (g/mL)ML	Lab File ID:
Level: (low/med) LOW	Date Received:
% Moisture: not dec dec	Date Extracted: 03/06/90
Extraction: (SepF/Cont/Sonc) SEPF	Date Analyzed: 03/10/90
GPC Cleanup: (Y/N)N pH:	Dilution Factor: 1.0
	NTRATION UNITS: or ug/Kg)UG/L Q
319-84-6beta-BHC 319-85-7beta-BHC 319-86-8delta-BHC 58-89-9gamma-BHC (Lindane) 76-44-8Heptachlor 309-00-2Aldrin 1024-57-3	0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.050 U 0.1

1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ab Name: AQUATEC, INC. Contract: 89150	MWAA-2MS
ab Code: AQUAI Case No.: 20374 SAS No.:	SDG No.: 11115
Matrix: (soil/water)WATER Lab Sample	ID: 111156MS
cample wt/vol: 1005 (g/mL)ML Lab File I	D:
	ved: 03/02/90
Moisture: not dec dec Date Extra	cted: 03/06/90
-	zed: 03/10/90
PC Cleanup: (Y/N)N pH: Dilution F	actor: 5.0
CAS NO. COMPOUND CONCENTRATION UN (ug/L or ug/Kg) Ud	
319-84-6alpha-BHC	0.25 U
319-85-7beta-BHC 319-86-8delta-BHC	0.25 เบ
58-89-9gamma-BHC (Lindane)	0.25 0
76-44-8Heptachlor	
309-00-2Aldrin	
1024-57-3Heptachlor enovide	
959-98-8Endosulfan I	0.25 U
OUTD/TITTETOTO	0.2310
72-55-94,4'-DDE	0.50 U
//=/U=3================================	
33213-65-9Endosulfan II	0.50 U
72-54-84,4'-DDD	0.50 U
1031-07-8Endosulfan sulfate 50-29-34,4'-DDT	0.50 U
72-43-5Methoxychlor	
1 33494-70-5Phdrin Vatana	2.5 U
5103-71-9alpha-Chlordane	0.50 0
1 3103-74-2 Tamma-Chlordane	2.5 0
8001-35-2Toxaphene	2.5 0
12674-11-2Aroclor-1016	5.0 0
11104-28-2Aroclor-1221	2.5 0
11141-16-5Aroclor-1232	2.5 U
53469-21-9Aroclor-1242	2.5 0
12672-29-6Aroclor-1248	2.5 0
11097-69-1Aroclor-1254	2.5 0
11096-82-5Aroclor-1260	5.0 0
	5.0 0

1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MWAA-2MSD]
	<u></u> l

Lab Name: AQUATEC, INC.

Contract:89150

Lab	Code:	AQUAI	Case No.:	20374	SAS No.:	SDG	No.:	11115
-----	-------	-------	-----------	-------	----------	-----	------	-------

Matrix: (soil/water)WATER

Lab Sample ID: 111156MD

Sample wt/vol: 1005 (g/mL)ML

Lab File ID:

Level: (low/med) LOW

Date Received: 03/02/90

% Moisture: not dec._____ dec.____

Date Extracted: 03/06/90

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/10/90

GPC Cleanup: (Y/N)N pH:____

Dilution Factor: 5.0

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg)UG/L

		ī
319-84-6alpha-BHC	0.25	Ŭ
319-85-7beta-BHC	0.25	
319-86-8delta-BHC	i 0.25	•
58-89-9gamma-BHC (Lindane)	<u> </u>	İ
76-44-8Heptachlor		'
309-00-2Aldrin		<u> </u>
1024-57-3Heptachlor epoxide	0.25	Ü
959-98-8Endosulfan I	0.25	•
60-57-1Dieldrin	—i	
72-55-94,4'-DDE	0.50	ប៊
72-20-8Endrin	 i	
33213-65-9Endosulfan II	0.50	Ū
72-54-84,4'-DDD	0.50	•
1031-07-8Endosulfan sulfate	0.50	•
50-29-34,4'-DDT		
72-43-5Methoxychlor	2.5	U
53494-70-5Endrin ketone	0.50	ប
5103-71-9alpha-Chlordane	2.5	
5103-74-2gamma-Chlordane	2.5	•
8001-35-2Toxaphene	5.0	•
12674-11-2Aroclor-1016	2.5	•
11104-28-2Aroclor-1221	2.5	•
11141-16-5Aroclor-1232	2.5	U
53469-21-9Aroclor-1242	2.5	•
12672-29-6Aroclor-1248	2.5	•
11097-69-1Aroclor-1254		•
11096-82-5Aroclor-1260	5.0	•

ANALYTICAL RESULTS



ENVIRONMENTAL SERVICES
75 Green Mountain Drive, So. Burlington, VT 05-03
TEL. 802/636-1074

NARRATIVE



ENVIRONMENTAL SERVICES
75 Green Mountain Drive, So. Burlington, VT 05403
TEL. 802/656-1074

GREEN MOUNTAIN DRIVE, SOUTH BURLINGTON, VERMONT 05403, TELEPHONE (802) 658-1074

March 16, 1990

Y.S. Edward Chen, Ph.D., P.E. YEC, Inc. Forest View Professional Building 10 Pine Crest Road Valley Cottage, NY 10989

Analytical Services Subcontract Re: Aquatec Project No. 89150 Case No. 20181; SDG No. 110525 ETR No's. 20181 and 20185

Dear Dr. Chen:

Enclosed are the results of analyses performed on Atlantic Asbestos site soil, sediment, and sludge samples received from YEC, Inc.

The samples were received intact February 15, 1990 with the exception of a broken container (asbestos testing) of sample SDAA-4 and sample SSAA-3 (extractable organics testing). There was sufficient quantity of both samples to complete all tests requested however.

For the samples received, laboratory numbers were assigned and designated as follows:

YEC Sample No.	Aquatec Sample No.	Aquatec ETR No.	Sample Matrix
Sludge #1 Sludge #2 Sludge #3 Sludge #4 Sludge #5 Sludge #6 Sludge #7 SDAA-X/ SDAA-X/ SSAA-1 SSAA-2 SSAA-3 SSAA-4	110525 110526 110527 110528 110529 110530 110531 110577 110578 110579 110580 110581	20181	Sludge Sludge Sludge Sludge Sludge Sludge Sludge Sludge Soil/Sediment Soil/Sediment Soil/Sediment Soil/Sediment
DOUV-4	110282		Soil/Sediment

900001

Y.S. Edward Chen, Ph.D., P.E. March 16, 1990 Page 2

Additional quantities of sample SSAA-1 were submitted to the laboratory to provide extra sample for quality control analysis. Subsamples of SSAA-1 (Lab No. 110579) designated for quality control analysis were independently logged into the laboratory for the purpose of internal sample tracking. The quality control samples were assigned laboratory numbers 110579MS (matrix spike), 110579MD (matrix spike duplicate), and 110579DP (duplicate).

An additional qualifier has been used in reporting the analytical results. It is listed and defined as follows:

Y - The reported pesticide/PCB result is below the adjusted contract reporting limit.

All of the samples required sulfur clean-up in preparation for pesticide/PCB analysis. The associated method blank(s) were taken through the clean-up procedure as well. Chromatographic peaks characteristic of Aroclors 1248, 1254, and 1260 were detected in the extract of Sludge #2 (Lab No. 110526). The PCB concentration was quantified as Aroclor 1254 as it was felt that this most accurately reflected the concentration found in the sample.

The matrix spike recoveries for antimony, arsenic, and selenium were out of the specified tolerances in the matrix analysis of sample SSAA-1 (Lab No. 110579MS). In addition, the replicate analysis of SSAA-1 for arsenic did not correspond well. The analytical data has been qualified accordingly.

Finally, sludge samples numbered 1 through 7 were analyzed by Polarized Light Microscopy (PLM) to determine if asbestos was present at concentrations greater than one percent. Samples were mixed, and subsamples dried at 50°C for 16 hours. The dried material was then analyzed by PLM using a dispersion staining technique and quantified at a magnification of 100x using the point counting technique.

Please note the addition of page 000989A as part of the case documentation.

Sincerely,

Joseph K. Comeau, Ph.D.

Vice President

Chemistry Division

JKC/lam

Enclosure

89150B16MAR90

ENVIRONMENTAL SERVICES

75 Green Mountain Drive, So. Burlington, VT 05403 TEL., 802/658-1074

ANALYTICAL REPORT

YEC, Inc.

10 Pine Crest Road

Valley Cottage, NY 10989

Date : 03/16/90 ETR Number : 20181 Project No.: 89150

No. Samples: 7

Arrived : 02/15/90

Attention: Dr. Y.S. Ed Chen

Page 1

SDG:110525 Atlantic Asbestos Site

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater.

All results are in mg/l unless otherwise noted.

Method No. Parameter
SUBCON Asbestos by PLM

Lab No.	Sample Description	Result

110525	Sludge #1	<1
110526	Sludge #2	Positive
_110527	Sludge #3	<1
1.10528	Sludge #4	<1
110529	Sludge #5	Positive
110530	Sludge #6	Positive
110531	Sludge #7	Positive

Comments/Notes

Note: Asbestos results are reported as percent.

000003

< Last Page >

Submitted By :

Joseph Com

Aquatec Inc.



75 Green Mountain Drive, So. Burlington, VT 05403 TEL. 802/658-1074

ANALYTICAL REPORT

YEC, Inc.

10 Pine Crest Road

Valley Cottage, NY 10989

: 03/16/90 Date ETR Number: 20185 Project No.: 89150

No. Samples: 9

Arrived : 02/15/90

Attention : Dr. Y.S. Ed Chen

Page

1

SDG:110525 Atlantic Asbestos Site

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater.

All results are in mg/L unless otherwise noted.

Method No.

Parameter

SUBCON

Asbestos by PLM

Lab No.	Sample Description	Result
110577	SDAA-3:02/14/90 @1300	<1
110578	SDAA-4:02/14/90 @1325	<1

Comments/Notes

000004

Note Asbestos results are reported as percent.

< Last Page >

Submitted By :

Aquatec Inc.

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

b Name:	Aquatec, Inc.	_ Conti	act: 09130	 .	
code:	AQUAI Case No.:	20181 - SAS 1	io.:	SDG No.: 11	10525
No.:					
	EPA Sample No.		Lab Sample ID	١.	
	Sludge l		110525		
	Sludge 2		110526		
	Sludge 3		110527	•	
	Sludge 4		_110528		
	SDAA-3		110577		
•	SDAA-4 SSAA-1		110579		
	SSAA-1S		110579MS		
	SSAA-1D		110579DP		
	SSAA-2		110580		
	SSAA-3		110581		
	SSAA-4		110582		
	·				
					
e ICP	interelement corrections	applied?		Yes/No	NO
re ICP background corrections applied?			Yes/No	YES	
ır y appl	es-were raw data generate ication of background cor	rections?		Yes/No	_NO
mments:					
					-
		•	<u> </u>		
		- 	data maskana	and in the	
lease o	f the data contained in treadable data submitted of	nis narucopy on flormy dis	uata patkaye kette has been	and in the	bv
e Labor	atory Manager or the Mana	ger's design	ee, as verifie	d by the	
llowing	signature.			9 _	
	-	Lab Manag	er: Spanl	mee	
			te: 30140		
					_
	CC	OVER PAGE - I	N L L	7/8	0000
	•			U	$\sigma \sigma \sigma \sigma$

U.S. EPA - CLP

		MOVOWITC V	nalysis data s	HEET	1
Lab Name:	Aquatec, In	c	Contract: _	89150	PBS
Lab Code: AQUA	<u>I</u> Ca:	se No.: 20	181 SAS No.:		SDG No.: 110525
Matrix (soil/w	ater): WATE	R		Lab Samp	le ID: 110525PB
Level (low/med):			Date Rec	eived:
% Solids:	-				
Cor	ncentration	Units (ug/	L or mg/kg dry	weight):	mg/Kg
	CAS No.	Analyte	Concentration	c Q	
	7429-90-5	Aluminum	13.6		P
	7440-36-0			U N	F
	7440-38-2		<u> </u>	U N*	<u>F</u>
	7440-39-3	Barium_	0.76	ــــــالا ا	I <u>P</u> I
	7440-41-7		0.28	<u>الا ا</u>	1 <u>P</u> 1
. •	7440-43-9		0.80		<u> P </u>
	7440-70-2		57.2		<u> P </u>
	7440-47-3		1.3		<u> P </u>
	7440-48-4	• —	1 2.5		<u> P </u>
	7440-50-8			U E	<u> P </u>
	17439-89-6]3.6_		<u>P</u>
	[7439-92-1	•	0.22		I <u>F</u>
	17439-95-4	•			<u>P </u>
	7439-96-5 7439-97-6				I P
	17440-02-0		0.1		<u>CV </u>
	17440-02-0	• —			i <u>P</u> i
	17782-49-2		0.28		i <u>F</u> i
	7440-22-4		0.56		i <u>A</u> i
•	17440-23-5	Sodium	67.1		P
•	7440-28-0	Thallium	0.52	101	I <u>F</u>
	7440-62-2	Vanadium_	1.9_		I <u>P</u> I
	7440-66-6	Zinc	11.3		1 <u>P</u>
	İ	Cyanide_		U	!!
	I	.1	l	<u> _ </u>	11
Color Before:		Clari	ty Before:		Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:			•		

	•	v.s.	EPA - CLP		
•	. 3	NORGANIC A	1 NALYSIS DATA S	HEET	EPA SAMPLE NO.
Lab Name:	Aquatec, Inc		Contract: _	89150	SLUDGE 1
1011					
Lab Code: AQUA	AI Ca	se No.: 20	181 SAS No.	:	SDG No.: 11052
Matrix (soil/w	ater): SOI	<u>L</u>		Lab Samp	le ID: 110525
Level (low/med):	_		Date Rec	eived: 02/15/90
	10.	4			
<pre>\$ Solids:</pre>		<u> </u>			
Cor	ncentration	Units (ug/	L or mg/kg dry	weight):	ma/Ka
					HEATTE.
	CAS No.	1 3-01	 Concentration	1 1	
•	CAS NO.	Analyce	concentration	ICI Q	M
	7429-90-5	Aluminum	4180	¦-¦	P
	7440-36-0			I U N	F
	7440-38-2	Arsenic_		UI WN*	F
	7440-39-3	Barium	253		P
		Beryllium	6.3		<u> P </u>
	7440-43-9		6.3	111	<u> P </u>
	17440-70-2	• • • •	6340	101	1 <u>P</u> 1
	17440-47-3		25.9	_ E	<u> </u>
	17440-48-4	•	63.4		<u>P </u>
•	[7440-50-8	Copper	90.7	!_! <u>E</u>	<u> P </u>
	17439-89-6	Iron	5530	!-!	<u> P </u>
	7439-92-1	Lead	29.3	! <u>-</u> !	<u> F </u>
	17439-95-4	Magnesium		B	<u> P </u>
	17439-96-5 17439-97-6	Manganese		<u> _ E</u>	<u>P </u>
	7440-02-0		0.94	!!!	i_cyl
		Potassium	50.7		<u>P</u>
	7782-49-2	Selenium		UN	<u>P </u> <u>F </u>
	•	Silver	9.8	. — . — — —	.
•	7440-23-5		6340		<u> </u>
,		Thallium			i <u>r</u> i
	17440-62-2	Vanadium_	63.4		ipi
	7440-66-6	Zinc	162	E	P
	1	Cyanide_	11.1		i <u> </u>
	1	.1			
Color Before:		Clari	ty Before:		Texture:
Color After:		Clari	ty After:	<u> </u>	Artifacts:
Comments:					
					

		• • • • • • • • • • • • • • • • • • • •	EPA - CLP		
	Ţ	NORGANIC A	. 1 NALYSIS DATA S	HEET	EPA SAMPLE NO
ab Name:	Aquatec, Inc.		Contract: _	89150	SLUDGE 2
ab Code: AQUA	I Cas	se No.: <u>20</u>	181 SAS No.:	<u> </u>	SDG No.: 11052
atrix (soil/wa	ater): SOIL			Lab Sampl	le ID: 110526
evel (low/med)):			Date Rece	eived: 02/15/90
Solids:	22.	3			
	acentration	1	L or mg/kg dry	<u> </u>	
	CAS No.	Analyte	Concentration	ICI Q	M
	7429-90-5				P
	7440-36-0			U N	l <u> </u>
	7440-38-2 7440-39-3		170	<u>U </u>	
	7440-39-3 7440-41-7	Bervilium			P
	17440-43-9	Cadmium	4.2		I_P
	7440-70-2	Calcium	4240		i <u>P</u> i
	7440-47-3		-	i_i_E	<u> </u>
	7440-48-4		42.4	101	l <u>P</u> l
	7440-50-8		88.7	1_1 <u>E</u>	<u>P</u>
	7439-89-6		2150	1_1	l <u>P</u> l
	7439-92-1		22.1	1_1	<u>F</u>
	7439-95-4			1_!	<u> P </u>
	7439-96-5	Manganese	63.2		<u> </u>
	7439-97-6		0.45	<u> u </u>	CV
•	17440-02-0		1_50.0	!!	<u> _P </u>
	17440-09-7				P
	17782-49-2			<u> U WN</u>	F
•	17440-22-4	Silver	7.0	<u> U </u>	<u>_A</u> <u>_P</u>
	17440-23-5	Thallium			
	17440-28-0	[Vanadium]			i <u>r</u> i
	17440-62-2	Variation_	119	E	i <u>-</u>
		Cyanide_	6.5		<u> </u>
Color Before:	1	Clari	ty Before:	.1 _1	Texture:
Color After:		Clari	ity After:		Artifacts:

	•	U.S.	EPA - CLP	•	
	•	INORGANIC A	1 NALYSIS DATA S	HEET	EPA SAMPLE NO.
Lab Name:	Aquatec, In	c.	[*] Contract: _	89150	SLUDGE 3
Lab Code:	AQUAI	ase No.: _2	0181 SAS No.	•	SDG No.: 110525
Matrix (so	oil/water): SO	IL_		Lab Sampl	Le ID: 110527
Level (lov	·/med)·			Date Pece	o2/15/90
* Solids:	8	 n Units (ug/	/L or mg/kg dry		
				1 1	
	CAS No.	Analyte	 Concentration	ici Q i	M
	17429-90-5	Aluminum	14300	! -!!	<u>P</u>
		Antimony		UN	F
		Arsenic		U N*	Ē
		Barium	340		P
		Beryllium	8.5	iŭ i	P
	17440-43-9	Cadmium_		ŭ	P
		Calcium	<u> </u>	וֹטוֹ	P
	• '	Chromium		E	P
		Cobalt	· · · · · · · · · · · · · · · · · · ·	י די	P
		Copper	114	E	P
	7439-89-6		27600	i - i i	<u>-</u>
	7439-92-	• •	97.8	;-;;	F I
	7439-95-4	•		; ;;	P
	•	Manganese		E	P
	7439-97-6		1.2	•	CV
	7440-02-0		677	;	<u>P</u>
	7440-09-7	•	8480	iv i i	<u>P</u> i
	7782-49-2			:	主
	7440-22-4		16.2		<u>Ā</u> i
		Sodium	8480	i i i i i i i i i i i i i i i i i i i	<u>P</u>
•	7440-28-0	Thallium	16.2		F
	7440-62-2	Vanadium	84.8		Pi
	7440-66-6		380	E	<u>P</u>
		Cyanide_	15.5		— <u>i</u>
	(<u> </u>	_1			<u>_</u> i
Color Bef	ore:	Clari	ty Before:		Texture:
Color Aft	er:	Clari	ty After:		Artifacts:
Comments:					

U.S. EPA - CLP

	I	NORGANIC A	. 1 Nalysis data s	HEET	EPA SAMPLE NO.
Lab Name:A	quatec, Inc.		Contract: _	89150	SLUDGE 4
Lab Code: AQÜA	<u>I</u> Cas	e No.: 20	181 SAS No.:		SDG No.: 110525
Matrix (soil/wa	ter): SOIL	•		Lab Sampl	e ID: 110528
MGCTTK (Dept)		_	•	_	
Level (low/med)	:	<u> </u>		Date Rece	ived: 02/15/90
₹ Solids:	21.3	}			
	centration	— Units (ug/	L or mg/kg dry	weight):	mg/Kg
	CAS No.	Analyte	 Concentration 	C Q	М
	7429-90-5	Aluminum_	7040		P
	7440-36-0	Antimony_	54.1	<u>U N </u>	<u>F</u> !
	7440-38-2		•	<u>U N*</u>	F
	7440-39-3			<u> !! </u>	<u>P</u> !
	7440-41-7			<u> " </u>	P
	7440-43-9 7440-70-2			<u>U</u>	<u> </u>
	[7440-70-2 [7440-47-3		1159	E	P
		Cobalt		<u>ַ </u>	PI
		Copper	85.6	E	P
	1	Iron	13400		P
	7439-92-1	Lead	57.3	i – i – – i	F
		Magnesium		i	P
	7439-96-5			E	<u>P</u> 1
	7439-97-6		1.4	1_11	CVI
	7440-02-0		1 309	ا_ا <u>ا</u>	<u>P</u>
	7440-09-7		•	<u> U </u>	<u>P</u> !
	7782-49-2			U N	F
	7440-22-4	Silver	•	[부]	<u>A</u> !
•	7440-23-5	Sodium		<u> u u u u u u u u u u</u>	P
•	17440-28-0		8.2		<u>F </u> <u>P </u>
	17440-62-2 17440-66-6		1	E	P
	1/440-66-6	Cyanide_	110.8	<u> </u>	i -i
		[0]4		;	
		. '	. '	· •• ·	
Color Before:		Clari	ty Before:		Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:			·		

FORM I - IN

7/87 Rev. IFB Amendment One

	•	U.S.	EPA - CLP			
		NORGANIC A	1 NALYSIS DATA S	SHE	ET	EPA SAMPLE NO.
Lab Name:	Aquatec, Inc	·	Contract: _	8	9150	SDAA-2/
Lab Code: AQUA	<u>I</u> Ca	se No.: 20	181 SAS No.	: _		SDG No.: 110525
Matrix (soil/w	ater): SOII			L	ab Samp	le ID: <u>110577</u>
Level (low/med):	_		Da	ate Rec	eived: 02/15/90
% Solids:	87.1	<u> </u>				
Cor	ncentration	Units (ug/	L or mg/kg dry	, w	eight):	mg/Kg
•		1	<u> </u>	1	<u> </u>	
	CAS No.	Analyte	Concentration	C	Q	M
	7429-90-5	Aluminum	11900	¦=;		P
	7440-36-0	Antimony_	13.2	יט ו	N	
		Arsenic	2.2	i	N*	F
	7440-39-3	Barium	53.7	i		<u>P</u> i
•	7440-41-7	Beryllium	1.1	Ů		i <u>P</u> i
	7440-43-9	Cadmium_	1.2	<u> </u>		i <u>r</u> i
	7440-70-2	Calcium_	1730	iΞ		<u>P</u> 1
	7440-47-3	Chromium	11.6	1	E	<u> </u>
	7440-48-4	Cobalt	11.0	ען.		I <u>P</u> i
÷.	17440-50-8	Copper	13.9		E	I <u>P</u> İ
	7439-89-6	Iron	14900			<u>P</u>
	7439-92-1	Lead	19.3	1_		I_FI
	7439-95-4	Magnesium		1_1		P
	7439-96-5	Manganese	92.9		<u>E</u>	<u>P</u> 1
	7439-97-6	•	0.11	U		CV I
	17440-02-0		23.6	<u> </u>		<u>P</u> I
	17440-09-7	Potassium			احسيا	<u>P_I</u>
	17782-49-2		6.2	ìπi	<u>WN</u>	F
	17440-22-4		1.2	Ų		_A _P
	17440-23-5		1100			<u>P</u> !
	17440-28-0	Vanadium_	1.2			<u>F</u> !
	17440-66-6	Zinc		!-!		PI
	1	Cyanide		!-!		<u> </u>
	·	CATUTAG_	0.69	141		-
Color Before:		Clari	ty Before:	·	اسسیس	! Texture:
Color After:			ty After:		•	Artifacts:
11111					•	wirilders:
Comments:			•			

	•	U.S.	EPA - CLP		•
· .	· _	NODCANIC A	1 NALYSIS DATA S	HEET	EPA SAMPLE NO
•		NORGANIC A	MUDICIES DATA S	neel	
b Name: Aq	uatec, Inc.		Contract: _	89150	SDAA-#/.
b Code: AQUA	I Cas	se No.: 20	0181 SAS No.:		SDG No.: 1105
D Code.			·		
trix (soil/w	ater): SOII	-		Lab Sampl	
evel (low/med):			Date Rece	ived: 02/15/90
calide:	63.0)	•		
Solids:					
Cor	centration	Units (ug/	L or mg/kg dry	weight):	mg/Kg
					 i
	1000	1 3-23-40	 Concentration	C Q I	M
	CAS No.	Analyce	Concentration		**
	7429-90-5	Aluminum_	23500	i-ii	P
		Antimony	15.6	UN	F
		Arsenic_	12.1	_ <u>SN*</u>	<u>F</u> 1
	7440-39-3	Barium	70.5		<u>P</u> [
	7440-41-7	Beryllium		االا	<u>P </u>
	7440-43-9		1_3.5	<u>_ </u>	<u>P</u> !
	7440-70-2		2130		<u>P [</u>
	7440-47-3		1 21.9	_ <u> E</u>	<u>P</u> !
	7440-48-4		16.0		<u>P </u>
	7440-50-8	Copper	1 34.8	!_! <u>E</u> !	P
	7439-89-6	Iron	41900	!-!	<u>P</u>
	[7439-92-1	Lead	1 34.3	!-!	F
	17439-95-4	Magnesium	1 7070	[-] <u>-</u>	P
	7439-96-5	Manganese	270	_ E	<u>P</u> 1
	17439-97-6		0.16	<u> </u>	CV I
	17440-02-0	Potassium			Pi
	17782-49-2			Ŭ WN	<u>F</u> i
	7440-22-4			וֹעוֹ	Ā
•	17440-23-5	Sodium		U	<u>P</u> (
•	7440-28-0		1.6		FI
	17440-62-2	[Vanadium]		1_11	<u>P</u>
	7440-66-6	IZinc	1110	_ E	P
	İ	Cyanide	0.95	<u> U </u>	
		_1	,	<u> _ </u>	
color Before:		Clari	ty Before:		Texture:
		~1	ty After:		Artifacts:
Color After:		CIAFI	urcar		
			•		
Comments:					

U.S. EPA - CLP EPA SAMPLE NO. INORGANIC ANALYSIS DATA SHEET SSAA-1 Aquatec, Inc. Contract: 89150 Case No.: 20181 SAS No.: SDG No.: 110525 Lab Code: AOUAI Matrix (soil/water): SOIL Lab Sample ID: 110579 Level (low/med): Date Received: 02/15/90 94.9 \$ Solids: Concentration Units (ug/L or mg/kg dry weight): mg/Kg CAS No. | Analyte |Concentration|C| 1 M I 15200 |7429-90-5 |Aluminum P [7440-36-0 | Antimony | 12.2 IUI N FI |7440-38-2 | Arsenic | F |7440-39-3 |Barium 62.2 P Beryllium 7440-41-7 1.0 JUI P 7440-43-9 Cadmium P 3.0 7440-70-2 [Calcium] P 1460 |7440-47-3 | Chromium 12.7 _E P |7440-48-4 |Cobalt 9.2 P |7440-50-8 | Copper 20.7 P [7439-89-6 [Iron_ 25500 ᆈ |7439-92-1 | Lead 17.3 F |7439-95-4 |Magnesium| 3920 Pl |7439-96-5 |Manganese| 903 Pl |7439-97-6 |Mercury 18.9 |7440-02-0 |Nickel P 7440-09-7 [Potassium] P BI 7782-49-2 | Selenium 6.0 U WN F |7440-22-4 |Silver <u> 1.2 | U |</u> A |7440-23-5 |Sodium 1010 IUI P |7440-28-0 |Thallium | 1.2 III F 7440-62-2 | Vanadium | 18.8 P 1 7440-66-6 | Zinc_ 73.5 Cyanide 0.61 <u>lul.</u> Color Before: Clarity Before: Texture: Color After: Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

		0.0.			
	1	NORGANIC A	1 NALYSIS DATA S	HEET	EPA SAMPLE NO.
Lab Name:	Aquatec, Inc	•	Contract: _	89150	SSAA-1S
Lab Code:	AQUAI Ca	se No.: _2	0181 SAS No.:		SDG No.: 11052
Matrix (so	il/water): SOI	<u>L</u>		Lab Sampl	e ID: 110579S
Level (low	/med):			Date Rece	ived: 02/15/90
* Solids:	92.	9			
	Concentration	Units (ug/	L or mg/kg dry	weight):	mg/Kg
		1	_	1 1	-
	CAS No.	Analyte	Concentration	ICI Q	M
	7429-90-5	Aluminum_		i i i i i i i i i i i i i i i i i i i	NR
		Antimony_		UN	F
		Arsenic		N*	F
	17440-39-3	Barium	262	1_11	<u>P</u> [
	7440-41-7	Beryllium	5.8	[]	P
	7440-43-9	Cadmium	1_8.4	<u> _ </u>	<u>P </u>
	17440-70-2	Calcium_		!_]!	NR
	7440-47-3	[Chromium]	32.2	!_! <u>E</u> !	P
	7440-48-4		1 63.2	!-!!	<u>P </u>
	[7440-50-8		47.6	!_ <u>E</u>	P
	17439-89-6		1 36 /	!-!!	NR
	7439-92-1		26.4	!-{ <u>}</u>	F
	17439-95-4	Magnesium	1080	E	<u>NR </u> <u>P</u>
	17439-96-5	Manganese Mercury_	0.52	!! !	CV
	17440-02-0		76.5	¦-¦	P
	17440-02-0	Potassium		¦-¦	NR
	7782-49-2		9.1	iu n	F
	7440-22-4	•	8.9		Āi
	7440-23-5				NRI
•	17440-28-0	Thallium	8.2		FI
	7440-62-2	Vanadium	67.8	1_11	P
	7440-66-6		120	1_ <u>E</u>	P
	İ	Cyanide_	6.1	! -!!	_!
		_1		1_11	
Color Bef	ore:	Clari	ty Before:		Texture:
Color Aft	er:	Clari	ty After:		Artifacts:
Comments:					
			·		

FORM I - IN

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	•	U.S.	EPA - CLP	•	
	ָ ב	NORGANIC A	1 Nalysis data s	HEET	EPA SAMPLE NO.
Lab Name: Aqu	uatec, Inc.		Contract:	89150	SSAA-1D
Lab Code: AOUA	AL Ca	se No.: _20	181 SAS No.:		SDG No.: 110525
Matrix (soil/wa	ater): SOIL			Lab Samp	le ID: 110579D
Level (low/med): <u> </u>			Date Rece	eived: 02/15/90
% Solids:	94.	9			
Cor	CAS No.	1	L or mg/kg dry Concentration	<u> </u>	mg/Kg
		Aluminum_ Antimony_		UN	 _P -E
	7440-38-2 7440-39-3 7440-41-7		$\begin{bmatrix} 3.6 \\ 61.1 \end{bmatrix}$	<u>SN*</u> 	F P
	7440-43-9 7440-70-2	Cadmium	2.4 1490		P
	7440-47-3 7440-48-4	Cobalt	9.3	E	P
	7440-50-8 7439-89-6 7439-92-1		22.5 24600 18.7	_ <u>E</u> _	<u>P</u>
	7439-95-4 7439-96-5	Magnesium	3980	E	F P
	7439-97-6 7440-02-0	Nickel	1 24.3	<u> </u>	CV I P I
	7440-09-7 7782-49-2 7440-22-4	Selenium_	· •	U WN	P
.•	7440-23-5 7440-28-0	Sodium Thallium	850		A P F I
•	7440-62-2 7440-66-6	Vanadium_ Zinc	20.1 74.5	_ _ <u>E</u>	P P
		Cyanide_	0.63	U	
Color Before:		Clari	ty Before:		Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:			•		
					

•	•	U.S.	EPA - CLP		
•	т	NORGANIC A	1 NALYSIS DATA S	HEET	EPA SAMPLE NO.
	_				SSAA-2
Lab Name:	Aquatec, Inc	<u> </u>	Contract:	89150	
Lab Code: AC	QUAI Ca	se No.: 20)181 SAS No.:		SDG No.: 110525
Matrix (soil	L/water): SOI	<u>L</u>			e ID: 110580
Level (low/m	med):	_		Date Rece	ived: 02/15/90
<pre>\$ Solids:</pre>	84.9				
	Concentration	Units (ug/	L or mg/kg dry	weight):	mg/Kg
	CAS No.	 Analyte	 Concentration	C Q	м
	17429-90-5	Aluminum	17300	¦- ¦'	P
	17440-36-0			UI WN	正
	7440-38-2		8.9	SN*	F
	7440-39-3		37.9	i_!!	PI
	7440-41-7	Beryllium	0.61	<u> </u>	<u>P</u>
	7440-43-9		3.4	_ <i></i>	<u>P</u> !
	7440-70-2		978		<u>P</u>
	7440-47-3			_ <u>E</u>	<u> </u>
	17440-48-4		1 15.6	!-!	<u>P</u> [
	17440-50-8		21.2	_ E	P
	17439-89-6		1 38300	¦¦	P
	7439-92-1 7439-95-4		1 34.6	!-:	F
	17439-96-5			E	P
	17439-97-6		· ————	iu	CV
	17440-02-0		24.9		Pi
	7440-09-7		610	ו עו	P
	7782-49-2	Selenium	1 11.1	I II N	F!
	7440-22-4	Silver	12.2		A !
•	17440-23-5	Sodium	610		<u> </u>
•	7440-28-0	· · · · · · · · · · · · · · · · · · ·		<u> u — — </u>	F.
	17440-62-2			_ _ <u>E</u>	<u>P </u>
	[7440-66-6	Zinc	74.0		
		Cyanide_	1	<u> </u>	:- :
Color Befor	·••	Clari	ty Before:	·	Texture:
			ity After:		Artifacts:
Color After		Crát.		 .	
Comments:			•	<u> </u>	

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		0.5.	EPA - CLP		
· .		NORGANIC A	l Nalysis data s	HEET	EPA SAMPLE NO.
ab Name:	Aquatec, In	c.	Contract:	89150	SSAA-3
			_		
ab Code: AQUA	<u>\I</u> Ca	se No.: 20	181 SAS No.	:	SDG No.: 11052
Matrix (soil/w	ater): SOI	<u>L</u>		Lab Samp	le ID: 110581
evel (low/med	·):			Date Rece	eived: <u>02/15/90</u>
Solids:	99.8	3			
Cor	ncentration	Units (ug/	/L or mg/kg dry	veight):	mg/Kg
	CAS No.	Analyte	 Concentration	I I ICI Q	н
	7429-90-5	Aluminum	16500	;-; ;	P
	7440-36-0			U WN	i <u>F</u> i
	7440-38-2		7.7	SN*	F
	7440-39-3	Barium	21.2	I U I	P
	7440-41-7	Beryllium		וֹטוֹ	P
	7440-43-9		3.6	i_i	P
	17440-70-2		689		<u>P</u> 1
·		[Chromium_		1_1 <u>E</u> 1	P
	7440-48-4	•	9.9	<u> </u>	<u>P</u> [
	7440-50-8	• • • • • • • • • • • • • • • • • • • •	33.7	_ E	<u> P </u>
	17439-89-6	•	38400	<u> _ </u>	<u>P 1</u>
	7439-92-1		24.0	<u> _ </u>	E_I
	17439-95-4			<u> _ </u>	<u>P_</u>
	17439-96-5			<u> </u>	<u>P_1</u>
	7439-97-6		0.10	Ш	CV
	17440-02-0	•	30.7	!-!!	<u>P</u>
	17440-09-7		-	<u>B </u>	P
	17782-49-2		·	<u> </u>	<u>F</u> !
•	7440-22-4 7440-23-5	Sodium	1.7	<u> u </u>	<u>A </u>
•	17440-23-5	Thallium			P
	17440-62-2	Vanadium_	15 /	. – . – – – .	<u>F</u> !
	7440-66-6	Zinc	94.6	. – . – – .	<u>P </u>
	1	Cyanide	0.59	Ū	<u>P</u>
•					<u>_</u>
Color Before:		Clari	ty Before:		Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:			•		

		U.S.	EPA - CLP	•	
	I	NORGANIC A	1 Nalysis data s	HEET	EPA SAMPLE NO.
Lab Name:	Aquatec, Inc		Contract: _	89150	SSAA-4
"					202 11 110505
Lab Code: AQUA	<u> </u>	se No.: _20)181 SAS No.:		SDG No.: 110525
Matrix (soil/wa	ater): SOIL			Lab Sampl	e ID: <u>110582</u>
Level (low/med):			Date Rece	ived: 02/15/90
* Solids:	92.6	·			
Cor	centration	Units (ug/	L or mg/kg dry	weight):	mg/Kg
COI			n or may ke dry		
	CAS No.	Analyte	Concentration	ici Q	M
	7429-90-5	Aluminum	15200	¦-¦¦	 P
		Antimony_		UN	<u></u>
		Arsenic	8.2	SN*	<u></u>
	17440-39-3		48.5	i _ ii	<u>P</u> i
	7440-41-7		0.76		<u>P</u>
	7440-43-9		2.8	_	<u>_P</u>
	7440-70-2		895	!_!!	<u>P</u> [
	17440-47-3		16.1	!_! <u>_</u> E!	P
	17440-48-4	•	9.3	!-!- <u>-</u> !	- 본
	17440-50-8		23.1	!_! <u>_</u> E!	<u>P</u>
	17439-89-6		28300	!-!:	P
	7439-92-1 7439-95-4	Lead	1 96.0 5190	¦{}	<u>P</u>
	17439-96-5			E	_P
	17439-97-6		0.11	· — · — · ·	<u>cv</u> i
	17440-02-0		28.5	¦≚¦	<u>P</u> i
	7440-09-7		•	i u i	P
	7782-49-2	[Selenium_		U WN	Fĺ
	7440-22-4	Silver	1.5		A
•	7440-23-5	Sodium	755		P
•	7440-28-0		1.5	<u> U </u>	<u>F</u> !
	17440-62-2	[Vanadium_	18.0	<u> - </u>	P
	17440-66-6	Zinc	·	_ _E	P
		Cyanide_	0.64	'	<u>_</u>
Color Before:		Clari	ty Before:		Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:			,		

SLUDGE#1 ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052 (atrix: (soil/water)SOIL Lab Sample ID: 110525 Sample wt/vol: 1.1 (g/mL)GLab File ID: C110525V evel: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.88 Date Analyzed: 02/22/90 Column: (pack/cap) PACK Dilution Factor: CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kq)UG/KG Q 74-87-3-----Chloromethane 380|U 74-83-9-----Bromomethane 380 U 75-01-4-----Vinyl Chloride 380 U 75-00-3-----Chloroethane 380 U 75-09-2----Methylene Chloride_ 57 | BJ 67-64-1-----Acetone 380 U 75-15-0-----Carbon Disulfide 75-35-4-----1,1-Dichloroethene 190 U 75-34-3-----1,1-Dichloroethane 190 | U 540-59-0----1,2-Dichloroethene (total) 190 U 67-66-3-----Chloroform 190 0 107-06-2----1,2-Dichloroethane 190|U 190 | U 78-93-3----2-Butanone 71-55-6----1,1,1-Trichloroethane 380|U 56-23-5-----Carbon Tetrachloride 190 U 108-05-4-----Vinyl Acetate 190 U 75-27-4-----Bromodichloromethane 380 U 78-87-5----1,2-Dichloropropane 190|U 10061-01-5----cis-1,3-Dichloropropene_ 190 U 79-01-6----Trichloroethene 190|0 124-48-1-----Dibromochloromethane 190 U 79-00-5-----1,1,2-Trichloroethane_ 190 U 71-43-2----Benzene 19010 10061-02-6----trans-1,3-Dichloropropene 190 U 75-25-2----Bromoform 190|U 108-10-1----4-Methyl-2-Pentanone 190 | U 591-78-6----2-Hexanone 380 U 127-18-4----Tetrachloroethene 380 TU 79-34-5----1,1,2,2-Tetrachloroethane 190 U 108-88-3----Toluene 190 U 108-90-7-----Chlorobenzene 6100| 100-41-4----Ethylbenzene 190 | U 100-42-5----Styrene 190 U

1330-20-7-----Xylene (total)_

190|บ 190|

EPA SAMPLE NO.

T.ah	Name	AQUATEC,	TNC.
لتصيد	name	ACCALEC.	TMC.

Contract:89150

SLUDGE#1	İ
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Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110525

Sample wt/vol: 1.1 (g/mL)G

Lab File ID: C110525V

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.88

Date Analyzed: 02/22/90

Column: (pack/cap) PACK -

Dilution Factor: 1.0

CONCENTRATION UNITS: Number TICs found: 3 (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-28-5 2. 3.91-17-8	2-METHYLPROPANE UNKNOWN HYDROCARBON DECAHYDRONAPHTHALENE	3.70 29.80 32.65	280 230 200	BJ J
4 5 6				
7				
2				
4				
9. 0	1			
1. 2. 3.				
4				
8 9				

Lab Name: AQUATEC, INC. Contract: 89150 SLUDGE#2

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110526

Sample wt/vol: 3.0 (g/mL)G Lab File ID: D110526I2V

Level: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.62 Date Analyzed: 02/20/90

Column: (pack/cap) PACK - Dilution Factor: 1.0

	,,,,,	Q
74-87-3Chloromethane	1	U
74-83-9		
75-01-4Vinvl Chloride	- ·	U
/5-00-3Chloroethane	-	וַט י
75-09-2Methylene Chlorida	. 44	•
0/-04-1Acetone		BJ
75-15-0Carbon Digulfide		BJ
75-35-41 1-Dichlorooth	. 22	
/3-34-3	. 22	•
34U-37-U1.2-Dichloroethene /hohell	. 22	
0/-00-3	. 22	ן ט
107-06-21,2-Dichloroethane	. 31	l
78-93-32-Butanone	22	Ū
71-55-61,1,1-Trichloroethane	44	Ū
56-23-5Carbon Tetrachloride	22	ט
108-05-4Vinyl Acetate	22	
75-27-4Bromodichloromethane	1 44	
78-87-5	22	
78-87-51,2-Dichloropropane	1 22	
10061-01-5cis-1,3-Dichloropropene	22	
	22	
124-48-1Dibromochloromethane	22	
79-00-51,1,2-Trichloroethane	22	TT
	22	
10061-02-6trans-1,3-Dichloropropene		
	22	
108-10-14-Methyl-2-Pentanone	22	
	44	
127-18-4Tetrachloroethene	441	
// January	22	
108-88-3Toluene	22	
108-90-7Chlanch	22	
10U-41-4	22	
100-42-0	22]	
1330-20-7Xylene (total)	22]1	o j
	22 1	
	i	i

EPA SAMPLE NO.

SLUDGE#2	

Lab Name: AQUATEC, INC.

° Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110526

Sample wt/vol: 3.0 (g/mL)G Lab File ID: D110526I2V

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.62 Date Analyzed: 02/20/90

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 1

	(-3)		-,	
CAS NUMBER	COMPOUND NAME	RT RT 	EST. CONC.	
1.75-28-5	2-METHYLPROPANE	3.95	39	BJ
·				
5				
6				
O •				
9	i i			
.2	1			
3	{			
.3•				
.6		_		
9				
· · ·				
1.		- -		
3.				
5		_		
7.		- -		
28				
0		_ -		
		_		

SLUDGE#3 ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052 Katrix: (soil/water)SOIL Lab Sample ID: 110527 Sample wt/vol: 1.5 (g/mL)G Lab File ID: D110527V Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.91 Date Analyzed: 02/20/90 Column: (pack/cap) PACK Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 74-87-3-----Chloromethane 370| U 74-83-9----Bromomethane 370 | 0 75-01-4-----Vinyl Chloride 370 | U 75-00-3----Chloroethane 75-09-2----Methylene Chloride 370 U 120|BJ 67-64-1-----Acetone 370 | U 75-15-0-----Carbon Disulfide 75-35-4----1,1-Dichloroethene 190 U 75-34-3----1,1-Dichloroethane 190 U 540-59-0----1,2-Dichloroethene (total) 190 | U 67-66-3-----Chloroform 190 | U 107-06-2----1,2-Dichloroethane 190 U 78-93-3----2-Butanone 190 U 71-55-6----1,1,1-Trichloroethane 370 | U 56-23-5-----Carbon Tetrachloride_ 190 | U 108-05-4-----Vinyl Acetate 190|0 75-27-4----Bromodichloromethane 370 | U 78-87-5----1,2-Dichloropropane 190 | 0 10061-01-5----cis-1,3-Dichloropropene_ 190|U 79-01-6----Trichloroethene 190 U 124-48-1-----Dibromochloromethane 190 U 79-00-5----1,1,2-Trichloroethane 190 0 71-43-2----Benzene 190 U 10061-02-6----trans-1,3-Dichloropropene 190 U 75-25-2----Bromoform 190 | U 108-10-1----4-Methyl-2-Pentanone 190 U 591-78-6----2-Hexanone 370 0 127-18-4----Tetrachloroethene 370 | U 79-34-5----1,1,2,2-Tetrachloroethane 190 | U 108-88-3----Toluene 190|U 108-90-7-----Chlorobenzene 50001 100-41-4----Ethylbenzene 190 U 100-42-5----Styrene 190 | 0 1330-20-7-----Xylene (total)_ 190 U 190 U

20

EPA SAMPLE NO.

				,
Lab	Name: AQUATEC,	INC.	Contract:89150	SLUDGE#3

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110527

Sample wt/vol: 1.5 (g/mL)G Lab File ID: D110527V

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.91 Date Analyzed: 02/20/90

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-28-5 2- 2	-METHYLPROPANE	4.05	600	=== BJ
3 ·				
o				
7.				
5 ·				
·		[
5				
5.				
/ •				
. •				
) •			· · · · · · · · · · · · · · · · · · ·	
3.	· · · · · · · · · · · · · · · · · · ·			

Lab Name: AQUATEC, INC. Contract: 89150 SLUDGE#4

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110528

Sample wt/vol: 3.1 (g/mL)G Lab File ID: D110528I2V

Level: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.82 Date Analyzed: 02/21/90

Column: (pack/cap) PACK - Dilution Factor: 1.0

74-87-3	(-3, - 0.00)	ay ngy ogy ng		Q
74-83-9	74-87-3Chloromethane			
75-01-4	74-83-9Bromomethane			
75-00-3	75-01-4Vinvl Chloride			
75-09-2	/5-00-3Chloroethane			
75-15-0	75-09-2Methylene Chloride			
75-15-0	0/-04-1Acetone		•	
75-35-4	75-15-0Carbon Digulfido	•	•	
1-1- 1-2- 1-3-	75-35-41 1-Dichlorostho	•	•	
Square	/3-34-3		•	
107-06-21,2-Dichloroethane	340-34-01.2-Dichloroethono (+-+-1)			
107-06-2	0/~00~3~~~~~~('D ArAfArm			
71-55-6	107-06-21 2-Dichlerecther	. 45	i U	
71-55-6	/0-71	. 45	U	
108-05-4	/1-55-6	90	U	
108-05-4Vinyl Acetate	JOTZJESETETETECZYNON Mobweski	.l 45	U	
78-27-4Bromodichloromethane 78-87-51,2-Dichloropropane 10061-01-5cis-1,3-Dichloropropene 79-01-6Trichloroethene 124-48-1Dibromochloromethane 79-00-51,1,2-Trichloroethane 71-43-2Benzene 10061-02-6trans-1,3-Dichloropropene 75-25-2Bromoform 108-10-14-Methyl-2-Pentanone 127-18-4Tetrachloroethene 79-34-5Tetrachloroethene 79-34-5Toluene 108-90-7Chlorobenzene 100-41-4Ethylbenzene 100-42-5	100-00-4Vinul Xaababa	. 45	U	
10061-01-5	/3-2/-4	90	Ü	
79-01-6Trichloroethene 124-48-1Dibromochloromethane 79-00-51,1,2-Trichloroethane 10061-02-6Benzene 1008-10-1Bromoform 108-10-1Bromoform 108-10-1	/0-0/	45	iσ.	
124-48-1	TOOUT_OT_D======C1G=1 3=D(9F19===================================	4.5	Ü	
79-00-5	79-01-6Trichlerech		•	
71-43-2Benzene 10061-02-6trans-1,3-Dichloropropene 75-25-2Bromoform 108-10-14-Methyl-2-Pentanone 127-18-4Tetrachloroethene 79-34-51,1,2,2-Tetrachloroethane 108-90-7Chlorobenzene 100-41-4Ethylbenzene 100-42-5	124-4X-1			•
10061-02-6trans-1,3-Dichloropropene 45 U 75-25-2Bromoform 45 U 108-10-14-Methyl-2-Pentanone 90 U 591-78-62-Hexanone 90 U 127-18-4Tetrachloroethene 45 U 108-88-31,1,2,2-Tetrachloroethane 45 U 108-90-7Chlorobenzene 45 U 100-41-4Ethylbenzene 45 U 1330-20-7	//			
10061-02-6trans-1,3-Dichloropropene		1	•	
108-10-14-Methyl-2-Pentanone 591-78-62-Hexanone 127-18-4Tetrachloroethene 79-34-51,1,2,2-Tetrachloroethane 108-90-7Chlorobenzene 100-41-4Ethylbenzene 100-42-5Styrene 1330-20-7Xylene (total)	10061-02-6		•	
108-10-14-Methyl-2-Pentanone		4		
127-18-4Tetrachloroethene 79-34-51,1,2,2-Tetrachloroethane 108-88-3Toluene 108-90-7Chlorobenzene 100-41-4Ethylbenzene 100-42-5Styrene 1330-20-7Xylene (total)	108-10-1	t e e e e e e e e e e e e e e e e e e e	•	
127-18-4Tetrachloroethene	591-78-6	1	•	
108-88-3Toluene 108-90-7Chlorobenzene 100-41-4Ethylbenzene 100-42-5Styrene 1330-20-7Xylene (total)	12/-18-4			i
108-90-7Chlorobenzene 45 U 100-41-4Ethylbenzene 45 U 100-42-5Styrene 45 U 1330-20-7Xylene (total)	79-34-5			1
108-90-7Chlorobenzene 45 U 100-41-4Ethylbenzene 45 U 100-42-5Styrene 45 U 1330-20-7Xylene (total) 45 U				1
100-41-4Ethylbenzene 100-42-5Styrene 1330-20-7Xvlene (total)	108-90-7Chlorob			1
1330-20-7Xylene (total) 45 U	100-41-4			į
1330-20-7Xylene (total) 45 U	100-42-5Etnylbenzene		•	- !
45 U	1330-20-7			[
45 U	Xylene (total)			ļ
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1E LATILE ORGANICS ANALYSIS DATA

EPA SAMPLE NO.

VOLATILE	ORGAN	IICS	ANALYS	[S	DATA	SHEET
TENTATI	VELY	IDE	TIFIED	CC	MPOUN	IDS

Lab Name: AQUATEC, INC. Contract: 89150

SLUDGE#4

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110528

Sample wt/vol: 3.1 (g/mL)G Lab File ID: D110528I2V

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.82 Date Analyzed: 02/21/90

Column: (pack/cap) PACK - Dilution Factor: 1.0

Number TICs found: 2 CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.	CONC.	Q
1.75-28-5	-METHYLPROPANE NKNOWN	4.05 29.00	======	86 78	==== BJ J
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1A VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SDAA-1 I ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052 atrix: (soil/water)SOIL Lab Sample ID: 110577 Sample wt/vol: 3.3 (g/mL)GLab File ID: D110577V evel: (low/med) Date Received: 02/15/90 Moisture: not dec.52 Date Analyzed: 02/21/90 olumn: (pack/cap) PACK Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 74-87-3-----Chloromethane 32|U 74-83-9----Bromomethane 75-01-4-----Vinyl Chloride_ 32 | U 75-00-3-----Chloroethane 32 | Ü 75-09-2-----Methylene Chloride_ 32 | U 16|U 67-64-1-----Acetone 75-15-0-----Carbon Disulfide 32 | U 75-35-4----1,1-Dichloroethene_ 16 | U 75-34-3----1,1-Dichloroethane 16|U 540-59-0----1,2-Dichloroethene (total) 16|U 67-66-3-----Chloroform 16|U 107-06-2----1,2-Dichloroethane 16 | U 78-93-3----2-Butanone 16 | U 71-55-6----1,1,1-Trichloroethane_ 32 I U 56-23-5-----Carbon Tetrachloride__ 16|U 108-05-4-----Vinyl Acetate 16|U 75-27-4----Bromodichloromethane 32 | U 78-87-5----1,2-Dichloropropane_ 16|U 10061-01-5----cis-1,3-Dichloropropene_ 16|U 79-01-6----Trichloroethene 16 | U 124-48-1-----Dibromochloromethane 16|U 79-00-5----1,1,2-Trichloroethane 16|U 71-43-2----Benzene 16|U 10061-02-6----trans-1,3-Dichloropropene 16|U 75-25-2----Bromoform 16 U 108-10-1-----4-Methyl-2-Pentanone 16|U 591-78-6----2-Hexanone 32 | U 127-18-4----Tetrachloroethene 32 | U 79-34-5----1,1,2,2-Tetrachloroethane 16 | U 108-88-3----Toluene 16 | U

108-90-7-----Chlorobenzene_

1330-20-7-----Xylene (total)_

100-41-4----Ethylbenzene

100-42-5----Styrene

16 U

16 | U

16|U

16|U

EPA SAMPLE NO.

SDAA-1	1

Lab Name: AQUATEC, INC..

Contract:89150

Lab Code: A	QUAI Case	No.:	20181	SAS No.:	SDG	No.:	11052
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Matrix: (soil/water)SOIL

Lab Sample ID: 110577

Sample wt/vol: 3.3 (g/mL)G

Lab File ID: D110577V

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.52

Date Analyzed: 02/21/90

Column: (pack/cap) PACK _

Dilution Factor: 1.0

Number TICs found: 1

Cas number	COMPOUND NAME	RT	EST. CONC.	
1.75-28-5 2 3	2-METHYLPROPANE	4.05		=== BJ
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SDAA-42 ab Name: AQUATEC, INC. Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

atrix: (soil/water)SOIL Lab Sample ID: 110578

Sample wt/vol: 3.4 (g/mL)G Lab File ID: D110578V

evel: (low/med) LOW

Date Received: 02/15/90

Moisture: not dec.46 Date Analyzed: 02/21/90

column: (pack/cap) PACK Dilution Factor:

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG 0

			~
74-87-3Chloromethane	1 3	ן 7 ן <i>ע</i>	
74-83-9Bromomethane			
75-01-4Vinvl Chloride		טן 7	
/5-00-3Chloroethane		טוק	
75-09-2Methylene Chloride		7 U	
0/-04-1Acetone		4 U	
75-15-0Carbon Digulfide	•	טן ל	
/5-35-41 1-Dichloroothone		טן נ	
/3-34-3		U	
340-33-0		U	
0/~00~3~~~~~~~(in Oroform		រៀប	
107-06-21, 2-Dichloroothana	•	7 J	
/0-73-3		וו	
71-55-6	27	ט ן י	
56-23-5Carbon Tetrachloride	14	U	
108-05-4Vinyl Acetate	14	U	
/D=2/=4======Propodiables====================================	27	U	
78-87-51,2-Dichloropropane		Ü	
10061-01-5		U	
10061-01-5cis-1,3-Dichloropropene		Ū	
124-48-1		ับ	•
124-48-1Dibromochloromethane		Ü	
79-00-51,1,2-Trichloroethane 71-43-2Benzene		Ü	
10061-02-6		Ū	
10061-02-6trans-1,3-Dichloropropene		Ü	
	14	•	
108-10-14-Methyl-2-Pentanone	27		
// - / 0 - 0	27		
27-18-4Tetrachloroethene	14		
'7-14-1		•	
	14	•	
.08-90-7Chlorobenzene	14		ļ
.UU-41-4	14	•	
UU-42-7-4-4-6-6-C+114-6-6	14	,	1
330-20-7Xylene (total)	14		- 1
(00001)	14	U	İ

EPA SAMPLE NO.

SDAA-42	

Lab Name: AQUATEC, INC.

Contract:89150

ab	Code:	AQUAI	Case No.:	20181	SAS No.:	SDC	No.	:	11052
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Matrix: (soil/water)SOIL

Lab Sample ID: 110578

Sample wt/vol: 3.4 (g/mL)G

Lab File ID: D110578V

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.46

Date Analyzed: 02/21/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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SSAA-1 ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052 atrix: (soil/water)SOIL Lab Sample ID: 110579 ample wt/vol: 3.3 (g/mL)G Lab File ID: D110579V evel: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.20 Date Analyzed: 02/21/90 Column: (pack/cap) PACK Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 74-87-3-----Chloromethane 19 | U 74-83-9-----Bromomethane 19 | U 75-01-4-----Vinyl Chloride 19 | U 75-00-3-----Chloroethane 19 | U 75-09-2-----Methylene Chloride 9 | U 67-64-1-----Acetone 19 | U 75-15-0-----Carbon Disulfide 9 1 0 75-35-4----1,1-Dichloroethene 9 | U 75-34-3----1,1-Dichloroethane 9 | U 540-59-0----1,2-Dichloroethene (total) 9 I U 67-66-3-----Chloroform 107-06-2----1,2-Dichloroethane 9 | 0 9 | 0 78-93-3----2-Butanone 19 | U 71-55-6----1,1,1-Trichloroethane 56-23-5-----Carbon Tetrachloride 910 9|0 108-05-4-----Vinyl Acetate 75-27-4----Bromodichloromethane 19 | U 78-87-5----1,2-Dichloropropane 9 | U 10061-01-5----cis-1,3-Dichloropropene_ 9 | U 79-01-6----Trichloroethene 9 | 0

124-48-1-----Dibromochloromethane

108-10-1----4-Methyl-2-Pentanone

127-18-4-----Tetrachloroethene

71-43-2----Benzene

108-88-3----Toluene

100-42-5----Styrene

75-25-2-----Bromoform

591-78-6----2-Hexanone

108-90-7-----Chlorobenzene

100-41-4----Ethylbenzene

1330-20-7-----Xylene (total)

79-00-5----1,1,2-Trichloroethane_

10061-02-6----trans-1,3-Dichloropropene

79-34-5----1,1,2,2-Tetrachloroethane

9 | 0

9 | U

9|U

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9 | U 19 | U

19 | U

9 | U

9 | U

9 1 0

9 | U

9 | 0

9 | 0 9 | U

EPA SAMPLE NO.

Lab Name: AQUATEC, INC.

Contract:89150

| SSAA-1

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110579

Sample wt/vol: 3.3 (g/mL)G

Lab File ID: D110579V

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.20

Date Analyzed: 02/21/90

Column: (pack/cap) PACK _

Dilution Factor: 1.0

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-28-5 2-	-METHYLPROPANE	1 4.00		=== BJ
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| SSAA-2 Lab Name: AQUATEC, INC. Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110580

Fample wt/vol: 3.2 (g/mL)G Lab File ID: D110580V

Level: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.16 Date Analyzed: 02/21/90

Column: (pack/cap) PACK Dilution Factor:

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q

74-87-3Chloromethane		
74-83-9		שופ
75-01-4Vinvl Chloride	•	פוע
/5-00-3Chloroethane	 ;	פוש
75-09-2Methylene Chlorida		שופ
67-64-1Acetone	· · •	U
75-15-0Carbon Digulfide		ָּטַ ו ָ
75-35-41 1-Dichlorootho	1	Ü
/3-34-31 1-Dichloroothoro	 .	UJE
540-59-01,2-Dichloroethene (total)	_!	טופ
67-66-3Chloroform	_!	טופ
107-06-21,2-Dichloroethane		טונ
78-93-32-Butanone	9	U
71-55-61,1,1-Trichloroethane	_ 19	וֹט
56-23-5Carbon Tetrachloride	•	Ü
108-05-4Vinyl Acetate	<u>.</u> 9	İυ
75-27-4	•	Ū
75-27-4Bromodichloromethane		Ü
78-87-51,2-Dichloropropane		บั
10061-01-5cis-1,3-Dichloropropene	· ,	ט
// VI VI		טו
124-48-1Dibromochloromethane	•	טו
79-00-51,1,2-Trichloroethane		Ü
	•	שׁו
10061-02-6trans-1, 3-Dichloropropene		U
	•	U
108-10-14-Methyl-2-Pentanone	· •	•
JJI /UTUTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	_ 19	•
127-18-4Tetrachloroethene	_ 19	ş —
/J-04-0	•	טו
	1	Ū
108-90-7Chlorohome	1	<u>ע</u>
100-41-4	1	U
100-42-5	1	U
1330-20-7Xylene (total)	.! 9	Ŭ
10001	.! 91	**

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	SSAA-2	
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EPA SAMPLE NO.

Lab Name: AQUATEC, INC.

Contract:89150

Lab	Code:	AQUAI	Case	No.:	20181	SAS No.:	SDG	No.:	11052
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Matrix: (soil/water) SOIL

Lab Sample ID: 110580

Sample wt/vol: 3.2 (g/mL)G

Lab File ID: D110580V

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.16

Date Analyzed: 02/21/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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SSAA-3 ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052 Matrix: (soil/water)SOIL Lab Sample ID: 110581 Gample wt/vol: 3.5 (g/mL)G Lab File ID: D110581V Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.16 Date Analyzed: 02/21/90 Column: (pack/cap) PACK Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 74-87-3----Chloromethane 17 | ט 74-83-9-----Bromomethane 17 U 75-01-4-----Vinyl Chloride 17 U 75-00-3-----Chloroethane 17 | U 75-09-2-----Methylene Chloride___ 9 1 0 67-64-1-----Acetone 17 | U 75-15-0-----Carbon Disulfide 75-35-4----1,1-Dichloroethene 9|0 75-34-3-----1,1-Dichloroethane 9 | U 540-59-0----1,2-Dichloroethene (total)_ 9 | U 9 | U 67-66-3-----Chloroform 107-06-2----1,2-Dichloroethane 9 | U 9 | U 78-93-3-----2-Butanone 71-55-6----1,1,1-Trichloroethane_ 17 | 0 56-23-5----Carbon Tetrachloride 910 108-05-4-----Vinyl Acetate_ 9 | U 75-27-4-----Bromodichloromethane 17 | U 78-87-5----1,2-Dichloropropane 9 | U 10061-01-5----cis-1,3-Dichloropropene_ 910 79-01-6----Trichloroethene 9 | U 124-48-1-----Dibromochloromethane 910 79-00-5----1,1,2-Trichloroethane 9|U 71-43-2----Benzene 9 | U 10061-02-6----trans-1,3-Dichloropropene 9 | U 75-25-2----Bromoform 9 1 0 108-10-1----4-Methyl-2-Pentanone 910 591-78-6----2-Hexanone 17 | U 127-18-4----Tetrachloroethene 17 | U 79-34-5----1,1,2,2-Tetrachloroethane 910 108-88-3----Toluene 910 108-90-7-----Chlorobenzene 9|0 100-41-4----Ethylbenzene 9|0 100-42-5----Styrene_ 9 | U 1330-20-7-----Xylene (total)_ 9|0

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	EPA	SAMPLE	NO.
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עפע	Name:	AUUALEC.	TMC.

Contract:89150

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Lab Code: AQUAI Case No.: 20181 SAS No.: ___ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110581

Sample wt/vol: 3.5 (g/mL)G

Lab File ID: D110581V

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.16

Date Analyzed: 02/21/90

Column: (pack/cap) PACK

Dilution Factor:

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	TCM COVC	
	COMPOUND NAME	== ======== 	EST. CONC.	l Q
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SSAA-4 ab Name: AQUATEC, INC. Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

fatrix: (soil/water)SOIL Lab Sample ID: 110582

Sample wt/vol: 3.2 (g/mL)GLab File ID: C110582V

Level: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.23 Date Analyzed: 02/21/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q

74-87-3Chloromethane	1 20	ן ט
74-83-9Bromomethane		ן ט ו
75-01-4Vinvl Chloride		
75-00-3Chloroethane		U
75-09-2Methylene Chloride		U
6/-64-1Acetone		BJ
75-15-0Carbon Disulfide		•
75-35-41 1-Dichloroethers	·	ľū
/3-34-31.1-Dichloroethano		•
340-39-01.2-Dichloroethens (+s	10	•
0/-00-3	 ;	•
107-06-21,2-Dichloroethane		•
/0-73-3	10	•
71-55-6	20	•
		ļΩ
108-05-4Vinyl Acetate		וַע
/3-4/-4		ַּט
78-87-51,2-Dichloropropane	10	U
10061-01-5cis-1,3-Dichloropropen	10	U
79-01-6Trichloroethene	e1 10	י
124-48-1Dibromochloromethane	1 10	•
79-00-51,1,2-Trichloroethane	1	
71-43-2Benzene		
10061-02-6	10	ับ
10061-02-6trans-1,3-Dichloroprope 75-25-2Bromoform	ene 10	U
108=10=1===============================	10	_
108-10-14-Methyl-2-Pentanone 591-78-62-Hexanone		
127-18-4		
127-18-4Tetrachloroethene		
79-34-51,1,2,2-Tetrachloroetha	ane	
108-90-7Chlorobenzene	i	
100-41-4Ethylbenzene		,
100-42-5Styrene		
1330-20-7Xylene (total)		
	10	υ

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TENTAT	TIVELY IDENTIFIED	COMPOUNDS	
			SSAA-4
Lab Name: AQUATEC, INC.	· · · · · · · · · · · · · · · · · · ·	ontract:89150	

Matrix: (soil/water) SOIL Lab Sample ID: 110582

Sample wt/vol: 3.2 (g/mL)G Lab File ID: C110582V

Date Received: 02/15/90 Level: (low/med) LOW

Date Analyzed: 02/21/90 % Moisture: not dec.23

Column: (pack/cap) PACK _ Dilution Factor: 1.0

Number TICs found:	1	(ug/L or ug/Kg)UG/KG
CAS NUMBER	COMBOIND NAME	

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
1.75-28-5 2. 3.	2-METHYLPROPANE	3.75	80	BJ
5. 6.				
8.				
11.				
14				
17.				<u> </u>
20	,			
22. 23. 24.				
25. 26. 27.				
28. 29. 30.				
		·		

VBLKH1 Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

fatrix: (soil/water)SOIL Lab Sample ID: CJQB003BV

Sample wt/vol: 3.3 (g/mL)G Lab File ID: CJQB003BV

Level: (low/med) LOW Date Received: 00/00/00

Moisture: not dec. 0 Date Analyzed: 02/21/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q

74-87-3	15 15 4 15 8 8	
75-01-4	15 15 4 15 8 8	
75-00-3	15 15 4 15 8 8	0 U U U U U U
75-00-3	15 4 15 8 8	5 U 5 U 5 U 5 U
75-09-2Methylene Chloride 67-64-1	4 15 8 8	J U U
75-15-0	15 8 8	טונ טונ
75-35-41,1-Dichloroethene	8 8	יט טוט
75-35-41,1-Dichloroethene	8	ប
75-34-31.1-Dichloroethane	8	• -
540-59-0		
Jav-Ja-U		U
0/-00-3Chloroform	_	U
107-06-21,2-Dichloroethane		וַט
/8-93-32-Rutanone		U
71-55-6	•	טו
20-23-5Carbon Totrachlesias	•	שו
108-05-4Vinyl Acetate	-	וע
75-27-4Bromodichloromethane	15	שו
78-87-51,2-Dichloropropane	! 8	ן ט
10061-01-5cis-1,3-Dichloropropene	İ . 8	Ü
79-01-6Trichloroethene	1 8	U
124-48-1Dibromochloromethane	1 8	U
79-00-5	8	Ü
79-00-51,1,2-Trichloroethane	1 8	Ū
10061-02-6	8	iΰ
10061-02-6trans-1,3-Dichloropropene	1 8	iu
108-10-1	1 . 8	បែ
108-10-14-Methyl-2-Pentanone	15	, –
591-78-62-Hexanone	15	•
127-18-4Tetrachloroethene		Ü
79-34-51,1,2,2-Tetrachloroethane	·	บั
:	i _	יי וע
108-90-7Chlorobenzene	7	
100-41-4Ethylbenzene		ָט ייי
100-42-5Styrene		U
1330-20-7Xylene (total)	Ξ !	Ŭ
	8	U

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ļ	TIPLE TELLS	1
l	VBLKH I (1
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EPA SAMPLE NO.

Lab Name: AQUATEC, INC.

Contract:89150

1	VBLKH1	1
1_		1

Lab Sample ID: CJQB003BV

Matrix: (soil/water) SOIL

Sample wt/vol: 3.3 (g/mL)G

Lab File ID: CJQB003BV

Level: (low/med) LOW

Date Received: 00/00/00

% Moisture: not dec. 0

Date Analyzed: 02/21/90

Column: (pack/cap) PACK -

Dilution Factor: 1.0

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.75-28-5	-METHYLPROPANE	3.75		===: J
3.				
5.				!
6				
7. 8.				ļ
9				
1				!
13.				
L4 •				
15.				
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2		<u> </u>		
4		_!!		
:D.				
6.		[[
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1A VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

•			VRLE	はなっ	
ab Name:AQUATEC, INC.	Contract:8	39150	VBLK	1166	
Lab Code: AQUAI Case N	o.: 20181 SAS No.:	SDG	No.:	11052	
atrix: (soil/water)SOIL		Lab Sample ID:	CJQB	002CV	
ample wt/vol: 3.1	(g/mL)G	Lab File ID:	CJQB	002CV	
evel: (low/med) LOW	ī	Date Received:	00/	00/00	
Moisture: not dec. 0		Date Analyzed:	02/	21/90	
olumn: (pack/cap) PACK	- r	Dilution Facto	r:	1.0	
	CONCENT	TRATION UNITS:			
CAS NO. COM		or ug/Kg)UG/KC		Q	
			 	<u> </u>	
74-87-3Chl	oromethane		16	ប	i
74-83-9Bro	momethane		16		i
75-01-4Vin	yl Chloride	!	16	Ŭ	İ
75-00-3Chl	oroethane	1	16	ן U	İ
75-09-2Met	nylene Chloride		4	J	ĺ
67-64-1Ace	cone		9	J	
75-15-0Car	bon Disulfide		8	U	ĺ
75-35-41,1	-Dichloroethene	l	8	ַּט	ĺ
75-34-31,1	-Dichloroethane		8	U	İ
1 67-66-2	-Dichloroethene (tota	al)	8	ַט	İ
67-66-3Chl	oroiorm		8	Ü	İ
107-06-21,2- 178-93-32-B	-Dichioroethane		8	ַ	İ
71-55-6	utanone		16	י ס	İ
1 56-22-5	,1-Trichloroethane		8	U	i
109-05-4 Time	on Tetrachloride		8	ับ	i
108-05-4Vin	/I Acetate		16	U	i
75-27-4Bro	nodichioromethane		8	ַ	Ĺ
78-87-51, 2	-Diculoropropane		8	U	Ì
79-01-6 m-4	-1,3-Dichloropropene_	<u> </u>	8	U	ĺ
79-01-6Tri	chioroethene		8	U	į
124-48-1Dib	romochioromethane		8	U	İ
79-00-51,1 71-43-2Ben	,2-Trichtoroethane		8	ט	l
10061=02=6=====+x2	zene		8	U	ĺ
75-25-2Brow	ns-1,3-Dichloropropen	1e	8	U	ĺ
108-10-14-M	motorm		8	U i	ĺ
591-78-62-He	scrivt-5-heurguoue		16	U j	ĺ
127-18-4Tet	sachlore_	!	16		l
79-34-51 1	,2,2-Tetrachloroethan		8		
108-88-3Toli	ene	le!	8		İ
108-90-7Chlo	robensone .	!	8	U į	
100-41-4Ethy	I bongone		8		
100-42-5styr	Theureue		8		1
1330-20-7Xyle	no (total)		8	U j	
Tobb 20 / The Avyle	me (forat)		8	U i	

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EPA SAMPLE NO.

VOLATILE ORGA					
TENTATIVELY	! IDE	TIFIED	CO	MPOUN	IDS

Lab Name: AQUATEC, INC. Contract: 89150

VBLKH42

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: CJQB002CV

Sample wt/vol: 3.1 (g/mL)G

Lab File ID: CJQB002CV

Level: (low/med) LOW

Date Received: 00/00/00

% Moisture: not dec. 0

Date Analyzed: 02/21/90

Column: (pack/cap) PACK

Dilution Factor:

1.0

Number TICs found: 1

			į Q
ETHYLPROPANE	== ====== 3.70	48	1
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Lab Name:	AQUATEC, I	NC.	Contract:89150) 	VBLKG9
Lab Code:	AQUAI	Case No.: 20181	SAS No.:	SDG	No.: 11052
Matrix: (s	soil/water	SOIL	Lab S	Sample ID:	DKHB002PV
Sample wt/	vol:	3.2 (g/mL)G	Lab F	ile ID:	DKHB002PV
Level: ((low/med)	LOW	Date	Received:	00/00/00
t Moisture	: not dec	. 0	Date	Analyzed:	02/20/90
Column: ((pack/cap)	PACK -	Dilut	ion Facto	r: 1.0
CAS	NO.	COMPOUND	CONCENTRATI (ug/L or ug		
74-	87-3	Chloromethane			1610
1 74-	83-9	Bromomothana		i I	16 U
75-	01-4	Vinvl Chlorida		I I	16 U 16 U
/3-	·UU-3	Chloroethane		ì	16 U
/ /5-	64 1	Methylene Chlo	ride	i	1 J
. 0/-	'04-1	1Catona		i	2 3
75-	15-U	Carbon Disulfi	de	ì	8 U
1 75-	34-2	1,1-Dichloroet	hene	İ	8 U
540	-59-0	1,1-Dichloroet	hane	İ	8 0
67-	66=3=====	1,2-Dichloroet	hene (total)	ĺ	8 0
107	-06-2	1,2-Dichloroet		1	8 U
. i 78-	93-3	2-Butanone	nane		8 i U
71-	55-6	1,1,1-Trichlor		Į.	16 U
	6J-J	TERMINATION TO A TO A TO A TO A TO A TO A TO A TO	petnane		8 U
I TOO.		Vinul lactor			8 U
1 / 3~.	<i>4</i> /-4	RYAMAA i Ah 1 awaa.	3¢h370		16 U j
/0~	0/-3	1.2-Dichlarane			8 U
1 200	01-01-2 -	Cleal labiable.			8 U j
					8 U .
1 124	-48-!	enelli hwanaakii			8 U I
1 13-1		1 1 7_M-i-b1	ethane		8 0 1
				•	8 0
1 1006	51-02-6	trang-1 2-Diski	oropropene		810 1
					8 0
1 108-	-10-1	4-Methyl-2-Pent	anone		810
					16 U
1 70-5	-18-4	Tetrachloroethe	ne		16 U
1 /3	,4-3	1 1 7 7	loroethane		8 U
1 100-	-00-j -00-7	Toluene			8 U j
1 100-		Chlorobenzene			8 U I
. 1 TOO-	'4 1 -4	Fthulboness —			8 U
1 200-	42-3	rescrives a			1 U 8 U 8
1330		Xylene (total)			8 U i
					A 1 1 1 1

8 | U 8 | U

1E VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TENTATIVELY	IDENTIFIED COM	(POUNDS	
		İ	VBLKG9
C, INC.	Contr	:act:89150	

Lab	Name	: AQUATEC,	INC.
-----	------	------------	------

Matrix: (soil/water)SOIL

Lab Sample ID: DKHB002PV

Sample wt/vol: 3.2 (g/mL)G

Lab File ID: DKHB002PV

Level: (low/med) LOW

Date Received: 00/00/00

% Moisture: not dec. 0

Date Analyzed: 02/20/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
	-METHYLPROPANE	3.90	10	•
2				!
4				!
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o •				
/·		i		
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·		!		
2		!!		
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VBLKH1 Lab Name: AQUATEC, INC. Contract:89150 Case No.: 20181 SAS No.: _____ SDG No.: 11052 Lab Code: AQUAI Matrix: (soil/water)SOIL Lab Sample ID: DKHB002QV Sample wt/vol: 3.3 (g/mL)GLab File ID: DKHB002QV Level: (low/med) LOW Date Received: 00/00/00 % Moisture: not dec. 0 Date Analyzed: 02/21/90 Column: (pack/cap) PACK Dilution Factor: CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 74-87-3-----Chloromethane 15 | U 74-83-9-----Bromomethane 15 J U 75-01-4-----Vinyl Chloride 15 | U 75-00-3-----Chloroethane 15|U 75-09-2----Methylene Chloride 8 ! U 67-64-1-----Acetone 15 U 75-15-0----Carbon Disulfide 8 | U 75-35-4----1,1-Dichloroethene 75-34-3----1,1-Dichloroethane 8 | U 8 | U 540-59-0----1,2-Dichloroethene (total) 8 | U 67-66-3-----Chloroform 8 | U 107-06-2----1,2-Dichloroethane 8 | U 78-93-3----2-Butanone 71-55-6----1,1,1-Trichloroethane 15 | U 56-23-5-----Carbon Tetrachloride 8 I U 108-05-4-----Vinyl Acetate 8 | U 75-27-4-----Bromodichloromethane 15 | U 78-87-5----1,2-Dichloropropane_ 8 | U 10061-01-5----cis-1,3-Dichloropropene_ 8 | U 79-01-6----Trichloroethene 8 | U 124-48-1-----Dibromochloromethane 8 | U 79-00-5----1,1,2-Trichloroethane 8 | U 71-43-2----Benzene 8 | U 10061-02-6----trans-1,3-Dichloropropene 8 | U 75-25-2----Bromoform 8 | U 108-10-1----4-Methyl-2-Pentanone 8 | U 591-78-6----2-Hexanone 15 | U 127-18-4----Tetrachloroethene 15 | U 79-34-5----1,1,2,2-Tetrachloroethane 8 | U 108-88-3----Toluene 8 I U 108-90-7-----Chlorobenzene 8 JU 100-41-4----Ethylbenzene_ 8 JU 100-42-5----Styrene 8 | U 1330-20-7-----Xylene (total)_

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VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TENTATIVELY	IDENTIFIED COMPOUNDS	
		VBLKH1
Lab Name: AQUATEC, INC.	Contract:89150	i i

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water) SOIL Lab Sample ID: DKHB002QV

Sample wt/vol: 3.3 (g/mL)G Lab File ID: DKHB002QV

Level: (low/med) LOW Date Received: 00/00/00

% Moisture: not dec. 0 Date Analyzed: 02/21/90

Column: (pack/cap) PACK - Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

Number TICs found: 1 (ug/L or u

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
2	-METHYLPROPANE	4.05	15	•
3				
6. 7. 8.				
9				
3				
6				
9				
;· !-				
4				
7:				
9				

Lab Name: AQUATEC, INC. Contract: 89150 SSAA-1MS

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110579MS

Sample wt/vol: 3.2 (g/mL)G Lab File ID: D110579MSV

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.20 Date Analyzed: 02/21/90

Column: (pack/cap) PACK - Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/KG Q

	,,,,,,	×
74-87-3Chloromethane		
74-83-9Bromomethane		סוס
75-01-4Vinvl Chloride		סוס
/5-00-3Chloroethane		טוט
75-09-2Methylene Chlorido		טוט
0/-04-1Acetone		ប
75-15-0Carbon Digulfide		טוט
/3-35-41 1-Dichlarath	. 10	טוט
/J-J4-J		
340-33-0	•	טוט
U		שו
107-06-21 2-Dichloroothan	•	טוי
/0-73-3	•	טוט
71-55-61 1 1-Trichlorooth	•	שו
VV"&J"]"""""""""""""""""""""""""""""""""		U
100-00-4Vinvi 100+3-0	10	וַס
/3-2/-4	20	Ü
/070/7377777777	.] 10	ַד
10061-01-5cis-1,3-Dichloropropene		ט ן
79-01-6Trichloroethene	1 10	
124-48-1	1	i
79-00-51,1,2-Trichloroethane	10	Ū
71-43-2Benzene	10	
10061-02-6trans-1,3-Dichloropropene	İ	i
75-25-2Bromoform	10	Ū
108-10-14-Methyl-2-Pentanone	10	•
591-78-62-Hexanone	20	
127-18-4Tetrachloroethene	20	
79-34-5	10	
79-34-51,1,2,2-Tetrachloroethane 108-88-3Toluene	10	•
108-90-7Chlorobenzene		
100-41-4Ethylbenzene	10	
100-42-5	10	
1330-20-7Xylene (total)	10	
	10	U
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: AQUATEC, INC. Contract: 89150

| SSAA-1MSD

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water) SOIL

Lab Sample ID: 110579MD

Sample wt/vol: 3.3 (g/mL)G Lab File ID: D110579MDV

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.20

Date Analyzed: 02/21/90

Column: (pack/cap) PACK

Dilution Factor: 1.0

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG O

75-00-3 75-09-2 67-64-1 75-15-0	-Bromomethane -Vinyl Chloride -Chloroethane -Methylene Chloride -Acetone		 E E	J
74-83-9 75-01-4 75-00-3 75-09-2 67-64-1 75-15-0	-Bromomethane -Vinyl Chloride -Chloroethane -Methylene Chloride -Acetone		e i t e i t	J
75-01-4 75-00-3 75-09-2 67-64-1 75-15-0	-Vinyl Chloride	1	Þįτ	
75-00-3 75-09-2 67-64-1 75-15-0	-Chloroethane -Methylene Chloride -Acetone	1		Ţ
67-64-1 75-15-0	-Acetone	· · · · · · · · · · · · · · · · · · ·	IL	
67-64-1 75-15-0	-Acetone		וֹפ	
75 - 15 - 0			שׁן כ	
75-25-4	-Carbon Disulfide		וֹכ	
1,7-2,2-4	-1,1-Dichloroethene	<u> </u>	1	•
75-34-3	-1,1-Dichloroethane		ַז וֹ פֿ	_
540-59-0	-1,2-Dichloroethene /t	- A - 9 1	שופ	
67-66-3	-Chloroform	·	טופ	
107-06-2	-1,2-Dichloroethane		טוכ	
78-93-3	-2-Butanone	1.	טו טו	
71-55-6	-1.1.1-Trichloroethane	<u></u> :	טו טו	
56-23-5	-Carbon Tetrachloride	 :	טו	
108-05-4	-Vinvl Acetate		ט טונ	
75-27-4	-Bromodichloromethane	•	טו טו	
78-87-5	-1.2-Dichloropropage T		טוי טוי	
10061-01-5	-Cis-1.3-Dichloroprope	ne	טוו	
/9-01-6	-Trichloroethene		יו	
124-48-1	-Dibromochloromethane		ט ו	
79-00-5	-1.1.2-Trichloroethane		טוי	
/43-2	-Benzene	- 1	10	
10061-02-6	trans-1.3-Dichloropro	pene	ี่เชิ	
/5-25-2	-Bromoform	:	טו	
108-10-1	-4-Methyl-2-Pentanone_		U	
091-78-6	-2-Hexanone	· · · · · · · · · · · · · · · · · · ·	U	
L27-18-4	Tetrachloroethene	1	טו	
79-3 <u>4-5</u>	1.1.2.2-Tetrachloroet	hane	מו	
LU5-88-3	·Toluene		!"	
L08-90-7	Chlorobenzene		¦-	
100-41-4	Ethylbenzene		1=	
100-42-5	Styrene		U	
1330-20-7	Xvlene (total)	· · · · · · · · · · · · · · · · · · ·	U	

2			•	•	 SLUDGE#1
Lab	Name: AQUATEC,	INC.		Contract:89150	510561#1

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110525

Sample wt/vol: 30.1 (g/mL)G Lab File ID: B110525DS

Level: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.89 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)- SONC Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 6.8 Dilution Factor: 5.0

CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/KG Q

	y ng) og / ng	Q	
108-95-2Phenol	3000		
111-44-4bis(2-Chloroethyl)ether_	_ 30000 _ 30000		
70-0/-82-Chlorophonol			
341-/3-11 3-Dichlorchonson	30000	•	
100-40-/	30000		
100-31-0KAN7VI algobal	30000		
70-00-1 2-Dichlorohomeon	30000		
70-48-/	. 30000		
108-60-1his/2-Chlamaia	. 30000	•	
		•	
041-04-/N-Witzoco-di	. 30000		
	. 30000		
yo-yo-iNitrohantan	. 30000		
/8-59-1Techhorene	. 30000		
887/5-5	.] 30000		
1UDT0/T9 / 4-Dimoth	30000		
00-00-0	30000		
111-91-1hie/2-0hlow	140000		
	30000		
	30000		į
	30000		Ì
100-4/-8	20000		j
0/-08-3	30000		i
	30000		i
	30000		i
	140000		j
88-06-22,4,6-Trichlorophenol	30000		−i
	30000	Ū	i
91-58-72-Chloronaphthalene	140000		i
	30000		i
	140000		i
208-96-8Acenaphthylene	30000		1
606-20-2	30000		- [
606-20-22,6-Dinitrotoluene	30000		ŀ
	22000	_	- [

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EPA SAMPLE NO.

SLUDGE#1

Lab Name: AQUATEC, INC.

Contract:89150

Matrix: (soil/water)SOIL Lab Sample ID: 110525

Sample wt/vol: 30.1 (g/mL)G Lab File ID: B110525DS

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.89 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 6.8 Dilution Factor: 5.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG

			**
99-09-2	3-Nitroaniline	140000	u T
83-32-9	Acenaphthene	30000	
51-28-5	2,4-Dinitrophenol	140000	
100-02-7	4-Nitrophenol	1400001	
132-64-9	Dibenzofuran	30000	
121-14-2	2,4-Dinitrotoluene	30000	
84-66-2	Diethylphthalate	1 3000011	
7005-72-3	4-Chlorophenyl-phenyle	ther_ 30000	
86-73-7	Fluorene	30000	
100-01-6	4-Nitroaniline	1400001	
534-52-1	4,6-Dinitro-2-methylph	nenol 140000it	
86-30-6	N-Nitrosodiphenylamine	2000017	
101-55-3	4-Bromophenvl-phenvlet	her 30000 U	
118-74-1	Hexachlorobenzene	30000	
87-86-5	Pentachlorophenol	140000	
85-01-8	Phenanthrene	30000 1	
120-12-7	Anthracene	30000	
84-74-2	Di-n-butylphthalate	3000010	
206-44-0	Fluoranthene	30000 [
129-00-0	Pyrene	30000 0	
85-68-7	Butylbenzylphthalate	30000 17	
91-94-1	3,3'-Dichlorobenzidine	60000 0	
56-55-3	Benzo(a)anthracene	30000 U	
218-01-9	Chrysene	3000017	
117-81-7	bis(2-Ethylhexyl)phtha	late 8700 J	
117-84-0	Di-n-octvlphthalate	30000 0	
205-99-2	Benzo(b) fluoranthene	30000 0	
207-08-9	Benzo(k) fluoranthene	30000 0	
50-32-8	Benzo(a)pyrene	3000011	
193-39-5	Indeno(1.2.3-cd) nyrene	20000111	
53-70-3	Dibenz(a,h)anthracene	30000 0	
191-24-2	Benzo(g,h,i)perylene	3000010	
		i 30000 U	J

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

5	SLUDGE#1	į

Lab Name: AQUATEC, INC.

Contract:89150

SL	JDGE	#1	- 1
			i

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110525

Sample wt/vol: 30.1 (g/mL)G

Lab File ID: B110525DS

Level: (low/med) LOW

Date Received: 02/15/90

Moisture: not dec.89 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)- SONC Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 6.8 Dilution Factor: 5.0

Number TICs found: 20

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

2. UNKNOWN ALIPHA	TIC HYDROCARBO	14.80		· ====-
2. UNKNOWN ALIPHA	TIC HYDROCARBO		60000	
	· · · · · ·	17.08 i	58000	
3.90-12-0 1-METHYLNAPHTH	ALENE	19.47	85000	
4UNKNOWN DIMETH	YLNAPHTHALENE	21.47	70000	
5.544-76-3 HEXADECANE	i	24.20	67000	• 1
6.629-78-7 HEPTADECANE	i	25.70	82000	
7.593-45-3 OCTADECANE	· · · · · · · · · · · · · · · · · · ·	27.13	63000	• .
8. UNKNOWN ALIPHA	TIC HYDROCARBO	32.20		
9. I UNKNOWN	į	33.23 i	52000 160000	
10. UNKNOWN ALTPHA	FIC HYDROCARBO	34.43	64000	
I TT. IUNKNOWN	ì	35.42		
UNKNOWN ALTPHA	TIC HYDROCARBO	36.48	71000	
UNKNOWN		37.45	53000	
UNKNOWN ALIPHA	TIC HYDROCARRO	20 20	79000	
I TO UNKNOWN ATTPHA	TIC HYDROCARBO	30.56	57000	
LONKNOWN ALIDHA	TIC HYDROCARBO	41 25	73000	
UNKNOWN POLYCY	TITC WYDDOCADD!	43 45 :	84000	
UNKNOWN POLYCY	TITC HVDDACADDI	42 22 :	84000	
	TIC HYDROCAPRO	42 25	87000	
LUNKNOWN		44.07	53000	-
2.1. •	1	44.07	130000	J
- 		 !.		
43•		 !.		
24. _		 !.		
25.		 [.		
20.		!.		
2/•		!.	I	
28.				
43.	· · · · · · · · · · · · · · · · · · ·			
30		!.		j
		!_		i

| SLUDGE#2

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110526

Sample wt/vol: 30.0 (g/mL)G

Lab File ID: B110526DS

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.78 dec.____

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)- SONC

Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 7.0 Dilution Factor: 2.5

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg)UG/KG Q

108-95-2Phenol	 7500	
111-44-4bis(2-Chloroethyl)ether	7500	•
95-57-82-Chlorophenol	7500	•
541-73-11,3-Dichlorobenzene	7500	•
106-46-71,4-Dichlorobenzene	7500	•
100-51-6Benzyl alcohol	7500	•
95-50-11,2-Dichlorobenzene	7500	
95-48-72-Methylphenol	7500	•
108-60-1bis(2-Chloroisopropyl)ether	7500	•
106-44-54-Methylphenol_	7500	•
621-64-7N-Nitroso-di-n-propylamine	7500	•
67-72-1Hexachloroethane	7500	•
98-95-3Nitrobenzene	7500	•
78-59-1Isophorone	7500	•
88-75-52-Nitrophenol	7500	
105-67-92,4-Dimethylphenol	7500	•
65-85-0Benzoic acid	36000	
111-91-1bis(2-Chloroethoxy) methane	7500	•
120-83-22,4-Dichlorophenol	7500	
120-82-11,2,4-Trichlorobenzene	7500	
91-20-3Naphthalene	i 3900	•
106-47-84-Chloroaniline	7500	Ū
87-68-3Hexachlorobutadiene	7500	ָּט i
59-50-74-Chloro-3-methylphenol	7500	•
91-57-62-Methylnaphthalene	27000	•
77-47-4Hexachlorocyclopentadiene	7500	· ———
88-06-22,4,6-Trichlorophenol	7500	
95-95-42.4.5-Trichlorophenol	36000	
91-58-72-Chloronaphthalene	7500	,
88-74-42-Nitroaniline	36000	
131-11-3Dimethylphthalate	7500	
208-96-8Acenaphthylene	7500	
606-20-22,6-Dinitrotoluene	7500	
		- [
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Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110526

Sample wt/vol: 30.0 (g/mL)G Lab File ID: B110526DS

Level: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.78 dec. Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)- SONC Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 7.0 Dilution Factor: 2.5

CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/KG O

		•	Q
99-09-23-Nitroaniline	36000		
83-32-9Acenanhthene	i 35000		
51-28-52 4-Dinitrophenol		•	
100-02-74-Nitrophenol	36000		
132-64-9	36000		
121-14-2 4-Dinitrotolucia	7500		
04-00-4Diethvinhthalata	7500		
/005-/2-34-Chlorophenyl-phonyl-th-	7500		
	7500		
100-01-6	7500		
534-52-1 6-Dinitro	36000	, -	
	36000		
	7500		
0/-80-5	7500		
OD-UI-8	36000	U	
120-12-7	7500	U	
84-74-2Di-n-butylphthalate	7500		
~UU-44-U	7500	U	
129=00=0========	7500		
85=68=7=================================	7500		
	7500		
56-55-3Benzo(a) anthracene	15000		
218-01-9Chrysene	7500		
117-81-7	7500		
117-81-7bis(2-Ethylhexyl)phthalate 117-84-0Di-n-octylphthalate	3400		
205-99-2	7500		
205-99-2Benzo(b) fluoranthene	7500		
	7500		
	7500		
	7500		
	7500	<u>.</u>	
191-24-2Benzo(g,h,i)perylene	7500 j	U .	
	7500	U	
) - Cannot be separated from Diphenylamine			_

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIF

EPA SAMPLE NO.

FIED COMPOUNDS		
	SLUDGE#2	
Contract • 99150	1	

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water) SOIL

Lab Sample ID: 110526

Sample wt/vol: 30.0 (g/mL)G Lab File ID: B110526DS

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.78 dec.

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 7.0 Dilution Factor: 2.5

CONCENTRATION UNITS: Number TICs found: 20 (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.90-12-0	1-METHYLNAPHTHALENE	19.47	18000	
2.544-76-3	HEXADECANE	24.20	29000	
3.629-78-7	HEPTADECANE	25.72	29000 32000	
4.593-45-3	OCTADECANE	27.15	32000 25000	
	UNKNOWN ALIPHATIC HYDROCARBO		24000	
5 6	UNKNOWN ALIPHATIC HYDROCARBO		24000 19000	
7.	UNKNOWN DIMETHOXY C-10 AROMA		160000	
7		31.48	150000	
8	UNKNOWN ALIPHATIC HYDROCARBO		18000	
9 10	UNKNOWN C-4 ALKYLPHENANTHREN		18000	
11.	UNKNOWN ALIPHATIC HYDROCARBO		•	
1 12	UNKNOWN ALIPHATIC HYDROCARBO	34.45	51000	,
12.	UNKNOWN	35.45	22000	,
13.	_ UNKNOWN	36.53	17000	•
14.		37.47	19000	•
15	UNKNOWN POLYCYCLIC HYDROCARB		33000	
16	UNKNOWN POLICICLIC HIDROCARD		39000	
	UNKNOWN	44.12	41000	
18. 19.	UNKNOWN	44.12	56000	
1 20	UNKNOWN		18000	•
20		44.87	27000	J
21.	- 			
22.	_ [
23.				
24				
] 23	_ i		[
20				1
2/				1
28			ii	i
29.			,	i
30.				i
				i

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET SLUDGE#3 Lab Name: AQUATEC, INC. Contract:89150 Case No.: 20181 SAS No.: _____ SDG No.: 11052 Lab Code: AQUAI Matrix: (soil/water)SOIL Lab Sample ID: 110527 Fample wt/vol: 30.0 (g/mL)GLab File ID: B110527S Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.92 dec. Date Extracted: 02/22/90 Fxtraction: (SepF/Cont/Sonc)- SONC Date Analyzed: 03/05/90 EPC Cleanup: (Y/N)Y pH: 6.6 Dilution Factor: CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG 108-95-2----Phenol 8200 I U 111-44-4----bis(2-Chloroethyl)ether 8200 | U 95-57-8-----2-Chlorophenol 541-73-1----1,3-Dichlorobenzene 8200 I U 106-46-7----1,4-Dichlorobenzene 8200 | U 100-51-6----Benzyl alcohol 8200 | U 95-50-1----1,2-Dichlorobenzene_ 8200 J U 95-48-7----2-Methylphenol 8200 U 108-60-1-----bis(2-Chloroisopropyl)ether 8200 J U 106-44-5----4-Methylphenol 8200 U 621-64-7----N-Nitroso-di-n-propylamine 8200 U 67-72-1-----Hexachloroethane_ 8200 U 98-95-3-----Nitrobenzene 8200 I U 78-59-1----Isophorone 8200 I U 88-75-5----2-Nitrophenol 8200 | U 105-67-9----2,4-Dimethylphenol_ 8200 U 65-85-0-----Benzoic acid 8200 J U 111-91-1----bis(2-Chloroethoxy) methane 40000 U 120-83-2----2,4-Dichlorophenol 8200 U 120-82-1----1,2,4-Trichlorobenzene_ 8200 U 91-20-3----Naphthalene 8200 J U

106-47-8----4-Chloroaniline

88-74-4----2-Nitroaniline

208-96-8-----Acenaphthylene

131-11-3-----Dimethylphthalate_

87-68-3-----Hexachlorobutadiene

91-57-6----2-Methylnaphthalene

88-06-2----2,4,6-Trichlorophenol

95-95-4----2,4,5-Trichlorophenol_

91-58-7----2-Chloronaphthalene___

59-50-7----4-Chloro-3-methylphenol_

77-47-4-----Hexachlorocyclopentadiene

FORM I SV-1

2000 J

8200 U

8200 | U

8200 | U

8200 U

8200 I U

40000 U

40000 U

8200 | U

8200 | U

8200 U

13000

0 0

| SLUDGE#3

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water) SOIL

Lab Sample ID: 110527

Sample wt/vol: 30.0 (g/mL)G

Lab File ID: B110527S

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.92 dec.____

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)- SONC Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 6.6 Dilution Factor: 1.0

CAS NO.

COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG Q

		, 3,,	-
99-09-2	3-Nitroaniline	40000	 U
83-32-9	Acenaphthene	8200	•
51-28-5	2,4-Dinitrophenol	40000	•
100-02-7	4-Nitrophenol	40000	•
132-64-9	Dibenzofuran	8200	•
121-14-2	2,4-Dinitrotoluene	8200	
84-66-2	Diethylphthalate	8200	
7005-72-3	4-Chlorophenvl-phenvlether	8200	
86-73-7	Fluorene	8200	
100-01-6	4-Nitroaniline	40000	•
534-52-1	4.6-Dinitro-2-methylphenol	1 40000	
86-30-6	N-Nitrosodinhenvlamine (1)	8200	•
101-22-3	4-Bromophenvl-phenvlether	8200	
TTR-/4-T	Hexachlorobenzene	8200	
B7-86-5	Pentachlorophenol	40000	•
85-01-8	Phenanthrene	8200	•
120-12-7	Anthracene	8200	•
84-74-2	Di-n-butylphthalate	8200	•
206-44-0	Fluoranthene	8200	•
129-00-0	Pyrene	8200	
35-68-7	Butylbenzylphthalate	8200	•
)1-94-1	3,3'-Dichlorobenzidine	16000	•
06-55-3	Benzo(a)anthracene	8200	•
218-01-9	Chrysene	8200	•
L17-81-7	bis/2-Ethylheyyllnhthalate	4100	•
L17-84-0	Di-n-octvlphthalate	8200	
205-99-2	Benzo(b) fluoranthene		
207-08-9	Benzo(k) fluoranthene	8200	
0-32-8	Benzo(a) pyrene	8200	
.93-39-5	Indeno(1 2 3-cd)nyrene	8200	
3-70-3	Dibenz(a,h)anthracene	8200	
91-24-2	Benzo(g,h,i)perylene	8200	
67-6	penso(d'n't) betAteue	8200	Ü

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

SLUDGE#3	

EPA SAMPLE NO.

ab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110527

ample wt/vol: 30.0 (g/mL)G

Lab File ID:

B110527S

Level: (low/med) LOW

Date Received: 02/15/90

Moisture: not dec.92 dec.

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/05/90

PC Cleanup: (Y/N)Y pH: 6.6 Dilution Factor: 1.0

Number TICs found: 20

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

		_	•	
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 2.544-76-3 3.629-78-7 4.593-45-3 5. 6. 7. 8. 9. 10. 11. 12. 13. 14.	UNKNOWN ALIPHATIC HYDROCARBO HEXADECANE HEPTADECANE OCTADECANE UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN POLYCYCLIC HYDROCARBO UNKNOWN POLYCYCLIC HYDROCARBO UNKNOWN POLYCYCLIC HYDROCARBO UNKNOWN	22.62 24.20 25.72 27.13 32.22 33.25 34.45 35.50 36.47 37.45 38.37 38.73 39.28 40.15 40.23 41.00 41.25	33000 46000 42000 38000 37000 40000 53000 69000 52000 81000 44000 120000 38000 35000 62000 73000 100000	

i SLUDGE#4

Lab Name: AQUATEC, INC.

Contract:89150

Matrix: (soil/water)SOIL

Lab Sample ID: 110528

Sample wt/vol: 30.1 (g/mL)G Lab File ID: B110528D2S

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.79 dec.

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc). SONC Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 6.4 Dilution Factor: 2.5

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

Q

108-95-2Phenol	7800	l U
111-44-4bis(2-Chloroethyl)ether	7800	•
95-57-82-Chlorophenol	7800	•
541-73-11,3-Dichlorobenzene	7800	•
106-46-71,4-Dichlorobenzene	7800	•
100-51-6Benzyl alcohol	7800	•
95-50-11,2-Dichlorobenzene	7800	•
95-48-72-Methylphenol	7800	•
108-60-1bis(2-Chloroisopropyl)ether	7800	•
106-44-54-Methylphenol	7800	•
621-64-7N-Nitroso-di-n-propylamine	7800	•
67-72-1Hexachloroethane	7800	•
98-95-3Nitrobenzene	7800	
78-59-1Isophorone	7800	
88-75-52-Nitrophenol	7800	7
105-67-92,4-Dimethylphenol	7800	ប
65-85-0Benzoic acid	38000	ับ
111-91-1bis(2-Chloroethoxy)methane	7800	ַ '
120-83-22,4-Dichlorophenol	7800	บ
120-82-11,2,4-Trichlorobenzene	7800	ט
91-20-3Naphthalene	1400	J
106-47-84-Chloroaniline	7800	U
87-68-3Hexachlorobutadiene	7800	Ū
59-50-74-Chloro-3-methylphenol	7800	ט
91-57-62-Methylnaphthalene	49000	
77-47-4Hexachlorocyclopentadiene	7800	Ū
88-06-22,4,6-Trichlorophenol	7800	
95-95-42,4,5-Trichlorophenol	38000	
91-58-72-Chloronaphthalene	7800	,
88-74-42-Nitroaniline	38000	
131-11-3Dimethylphthalate	7800	
208-96-8Acenaphthylene	7800	b.
606-20-22,6-Dinitrotoluene	7800	
		-
	· ———— ·	

ab Name:AQUATEC, INC. Contract:89150 SLUDGE#4

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

atrix: (soil/water)SOIL Lab Sample ID: 110528

Sample wt/vol: 30.1 (g/mL)G Lab File ID: B110528D2S

Hevel: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.79 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/05/90

PC Cleanup: (Y/N)Y pH: 6.4 Dilution Factor: 2.5

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

		~
99-09-23-Nitroaniline	38000	
83-32-9Acenaphthene	7800	•
51-28-52 4-Dinitrophenol		
100-02-74-Nitrophenol	38000	
132-64-9Dibenzofuran	38000	
121-14-22.4-Dinitrotolyana	7800	
84-66-2Diethylphthalate	7800	•
/005-72-34-Chlorophenyl-phenylother	7800	
00-/J-/Fluorene	7800	
100-01-64-Nitroaniling	7800	
534-52-1 6-Dini+vo-2	38000	
	38000	
101-55-34-Bromophenyl-phenylether	7800	
118-74-1Hexachlorobenzene	7800	U
87-86-5Pentachlorophenol	7800	U
85-01-8Phenanthrene	38000	Ū
120-12-7Anthracene	7800	iυ
84-74-2	7800	
84-74-2Di-n-butylphthalate	7800	
206-44-0Fluoranthene 129-00-0Pyrene	7800	
85-69-7	7800	
85-68-7Butylbenzylphthalate	7800	
	16000	
~~ JJ_J~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	7800	
210-01-31-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	7800	
117-81-7bis(2-Ethylhexyl)phthalate	7800	
	7800	
4VJ~JJ~Z~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
	7800	
	7800	
133-39-39	7800	
	7800	
191-24-2Benzo(g,h,i)perylene	7800	
	7800	U
l) - Cannot be separated from Diphenylamine	i	
- Departed from Dipnenylamine		

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SLUDGE#4	
1	i

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water) SOIL

Lab Sample ID: 110528

Sample wt/vol: 30.1 (g/mL)G

Lab File ID: B110528D2S

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.79 dec.___

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)_ SONC

Date Analyzed: 03/05/90

GPC Cleanup: (Y/N)Y pH: 6.4 Dilution Factor: 2.5

Number TICs found: 20

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	UNKNOWN ALIPHATIC HYDROCARBO	17 16	2222222222	=====
2.	UNKNOWN DIMETHYLNAPHTHALENE	21.53	37000	•
3.544-76-3	HEXADECANE	24.27	41000	
4.629-78-7	·	25.78	44000	
5.593-45-3	•	27.20	43000	•
6	•	31 50	40000	•
7.		31.50	38000	•
8.	UNKNOWN ALIPHATIC HYDROCARBO	33 33	38000	•
9.	UNKNOWN ALIPHATIC HYDROCARBO	34.50	69000	•
10.	UNKNOWN ALIPHATIC HYDROCARBO	35.56	45000	
11.	UNKNOWN ALIPHATIC HYDROCARBO	36.55	50000	
12.	UNKNOWN ALIPHATIC HYDROCARBO	37.52	50000	
13.	UNKNOWN ALIPHATIC HYDROCARBO	38 45	59000 48000	
14.	UNKNOWN ALIPHATIC HYDROCARBO	39.35	44000	
15.	UNKNOWN ALIPHATIC HYDROCARBO	39.63	43000	
16.	UNKNOWN ALIPHATIC HYDROCARBO	40.23	38000	
17.	UNKNOWN ALIPHATIC HYDROCARBO	41.33	56000	
18.	UNKNOWN POLYCYCLIC HYDROCARB	41.50	49000	
19.	UNKNOWN POLYCYCLIC HYDROCARB	42.37	60000	
20.	UNKNOWN	44.18	55000	•
21.		11.10	33000	J
22.		!		
23.			<u> </u>	!
24.				
25.				!
26.			[!
27.				!
28.		!		!
29.		[!
30.				!

SDAA-S [ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052 Matrix: (soil/water)SOIL Lab Sample ID: 110577 Sample wt/vol: 31.0 (g/mL)GLab File ID: B110577S Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.13 dec. Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc)_ SONC Date Analyzed: 02/27/90 PC Cleanup: (Y/N)Y pH: 7.3 Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG 108-95-2----Phenol 73010 111-44-4----bis(2-Chloroethyl)ether_ 95-57-8----2-Chlorophenol 730 | U 541-73-1----1,3-Dichlorobenzene 730 | U 106-46-7----1,4-Dichlorobenzene 730 U 100-51-6-----Benzyl alcohol 73010 95-50-1----1,2-Dichlorobenzene 730 U 95-48-7----2-Methylphenol 730 U 108-60-1----bis(2-Chloroisopropyl)ether 73010 106-44-5----4-Methylphenol 73010 621-64-7----N-Nitroso-di-n-propylamine 730 U 67-72-1-----Hexachloroethane 730 U 98-95-3-----Nitrobenzene 730|0 78-59-1-----Isophorone 730|0 88-75-5----2-Nitrophenol 730 | U 105-67-9----2,4-Dimethylphenol_ 730|U 65-85-0----Benzoic acid 73010 111-91-1-----bis(2-Chloroethoxy)methane 3600 U 120-83-2----2,4-Dichlorophenol 730|0 120-82-1----1,2,4-Trichlorobenzene 73010 91-20-3----Naphthalene 730 U 106-47-8----4-Chloroaniline 73010 87-68-3-----Hexachlorobutadiene 730|0 59-50-7----4-Chloro-3-methylphenol_ 730 | U 91-57-6----2-Methylnaphthalene 730|0 77-47-4-----Hexachlorocyclopentadiene_ 730ן דו 88-06-2----2,4,6-Trichlorophenol 73010 95-95-4----2,4,5-Trichlorophenol 730 I U 91-58-7----2-Chloronaphthalene 3600 U 88-74-4-----2-Nitroaniline 730 | T

131-11-3-----Dimethylphthalate_

606-20-2----2,6-Dinitrotoluene

208-96-8-----Acenaphthylene

3600 | U

73010

730|0 730 U

| SDAA-B|

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052

Matrix: (soil/water)SOIL

Sample wt/vol: 31.0 (g/mL)G

Lab Sample ID: 110577 Lab File ID: B110577S

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.13 dec.____

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)_ SONC

Date Analyzed: 02/27/90

GPC Cleanup: (Y/N)Y pH: 7.3 Dilution Factor: 1.0

CAS NO. COMPOUND

(ug/L or ug/Kg)UG/KG

CONCENTRATION UNITS:

Q

99-09-23-Nitroaniline	i 3600	U
83-32-9Acenaphthene	730	•
51-28-52,4-Dinitrophenol	3600	•
100-02-74-Nitrophenol	3600	•
132-64-9Dibenzofuran	730	•
121-14-22,4-Dinitrotoluene	i 730	
84-66-2Diethylphthalate	i 730	•
7005-72-34-Chlorophenyl-phenylethe	730	
86-73-7Fluorene	i 730	
100-01-64-Nitroaniline	3600	•
534-52-14,6-Dinitro-2-methylpheno	3600	•
86-30-6N-Nitrosodiphenvlamine (1)	•
101-55-34-Bromophenvl-phenvlether	730	
118-74-1Hexachlorobenzene	i 730	•
87-86-5Pentachlorophenol	3600	įυ
85-01-8Phenanthrene	730	-
120-12-7Anthracene	I 730	Ū
84-74-2Di-n-butylphthalate	I 730	Ū
206-44-0Fluoranthene	I 730	U
129-00-0Pyrene	I 730	U
85-68-7Butylbenzylphthalate	I 730	U
91-94-13,3'-Dichlorobenzidine	1500	U
56-55-3Benzo(a)anthracene	1 730	U
218-01-9Chrysene	730	U
117-81-7bis(2-Ethylhexyl)phthalat	e 730	U
117-84-0Di-n-octylphthalate	i 730	•
205-99-2Benzo(b) fluoranthene	730	•
207-08-9Benzo(k) fluoranthene	730	•
50-32-8Benzo(a)pyrene	730	•
193-39-5Indeno(1.2.3-cd)pyrene	730	
53-70-3Dibenz(a.h)anthracene	i 730 i	
191-24-2Benzo(g,h,i)perylene	730	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

SDAA-91	

EPA SAMPLE NO.

MAD NAME ROUNTED, INC.	ab	Name	: AC	UATEC,	INC.
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Contract:89150

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Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

atrix: (soil/water)SOIL

Lab Sample ID: 110577

ample wt/vol: 31.0 (g/mL)G

Lab File ID: B110577S

Level: (low/med) LOW

Date Received: 02/15/90

Moisture: not dec.13 dec.____

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)_ SONC

Date Analyzed: 02/27/90

PC Cleanup: (Y/N)Y pH: 7.3 Dilution Factor: 1.0

Number TICs found: 16

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

1. UNKNOWN 4.00 440 JB 2. UNKNOWN 4.83 1700 JB 3.123-42-2 2-PENTANONE, 4-HYDROXY-4-MET 5.85 5700 JBA 4. UNKNOWN 5.100-52-7 BENZALDEHYDE 10.63 2000 JB 6. UNKNOWN 11.60 490 JB 7.57-10-3 HEXADECANOIC ACID 29.28 1200 JB 8. UNKNOWN 31.75 420 J 9. UNKNOWN 37.45 540 J 10. UNKNOWN 37.45 540 J 11. UNKNOWN 37.45 540 J 12. UNKNOWN ALIPHATIC HYDROCARBO 39.28 930 J 12. UNKNOWN ALIPHATIC HYDROCARBO 41.02 2000 J 13. UNKNOWN ALIPHATIC HYDROCARBO 42.95 490 J 14. UNKNOWN ALIPHATIC HYDROCARBO 43.63 310 J 15. UNKNOWN 44.07 950 J 16. UNKNOWN 44.07 950 J 17. See See See See See See See See See Se	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q Q
30.	1	UNKNOWN 2-PENTANONE, 4-HYDROXY-4-MET UNKNOWN BENZALDEHYDE UNKNOWN HEXADECANOIC ACID UNKNOWN UNKNOWN UNKNOWN UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN UNKNOWN	4.83 5.85 8.90 10.63 11.60 29.28 31.75 37.45 38.77 39.28 41.02 42.95 43.63 44.07	440 1700 5700 900 2000 490 1200 420 540 300 930 2000 490 310 950	JB JBA JB JB JB J J J J J J J

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110578

Sample wt/vol: 30.0 (g/mL)G Lab File ID: B110578S

Level: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.37 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

PC Cleanup: (Y/N)Y pH: 6.6 Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/KG Q

108-95-2Phenol	1000	
111-44-4bis(2-Chloroethyl)ether	1000	•
95-57-82-Chlorophenol	1000	•
541-73-11.3-Dichlorohenzene	1000	•
106-46-71.4-Dichlorohenzene	1000	•
100-51-6Benzvl alcohol	1000	•
95-50-11.2-Dichlorobenzene	1000	
95-48-72-Methylphenol	1 1000	•
108-60-1bis(2-Chloroisopropyl) other	1000	1 -
100-44-54-Methvlphenol	4 1 E	•
621-64-7N-Nitroso-di-n-propylamine	1000	
0/-/2-1Hexachloroethane	. 1000	•
98-95-3Nitrobenzene	1000	•
78-59-1Isophorone	. 1000	•
88-75-52-Nitrophenol	1000	
105-67-92.4-Dimethylphenol	1000	•
65-85-0Benzoic acid	1000	•
111-91-1bis(2-Chloroethows)-others	5100	
14U-03-4	1000	
12U-82-11,2,4-Trichlorobenzone	1000	
J1-20-JNaphthalene	1000	•
106-47-84-Chloroaniline	1000	
87-68-3Hexachlorobutadiana	1000	•
59-50-74-Chloro-3-methylpho1	1000	
JI-3/-02-Methylnanhthalana	1000	
//-4/-4	1000	
- 00-U0-22.4.6-Trichlorophosel	1000	
// // //	1000	
91-58-72-Chloronaphthalene	5100	ן ט
88-74-42-Nitroaniline	1000	ן ט
131-11-3Dimethylphthalate	5100	U j
208-96-8Acenaphthylene	1000	υi
606-20-22,6-Dinitrotoluene	1000	υi
2, 6-Dinitrotoluene	1000	י ז
		i

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110578

Sample wt/vol: 30.0 (g/mL)G Lab File ID: B110578S

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.37 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.6 Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG

99-09-23-Nitroaniline	5100	1 77
83-32-9Acenaphthene	1000	•
51-28-52,4-Dinitrophenol	5100	•
100-02-74-Nitrophenol	5100	•
132-64-9Dibenzofuran	1000	•
121-14-22.4-Dinitrotoluene	1000	•
84-66-2Diethylphthalate	1000	•
7005-72-34-Chlorophenvl-phenvlether	1000	•
86-73-7Fluorene —	1000	•
100-01-64-Nitroaniline	5100	•
534-52-14.6-Dinitro-2-methylphenol	5100	•
80-30-6N-Nitrosodinhanvlamina /1\	7	•
101-55-34-Bromophenvl-phenvlether	1000	•
118-/4-1Hexachlorobenzene	1000	•
87-86-5Pentachlorophenol	1000	•
85-01-8Phenanthrene	5100	•
120-12-7Anthracene	1000	•
84-74-2Di-n-butylphthalate	1000	
206-44-0Fluoranthene	1000 1000	
129-00-0Pyrene		
85-68-7	1000 1000	
91-94-13.3'-Dichlorohengiding	2100	
20-55-3Benzo(a) anthracene	1000	_
218-01-9Chrvsene	•	
117-81-7bis(2-Ethylheyyl)nhthalato	1000	
11/-84-0Di-n-octvlnhthalata	1000	
205-99-2Benzo(b) fluoranthene	1000	
20/-08-9Benzo/k\fluoranthana	1000	
50-32-8Benzo(a) pyrene	1000	
193-39-5Indeno(1,2,3-cd)pyrene	1000	
53-70-3Dibenz(a,h)anthracene	1000	
191-24-2Benzo(g,h,i)perylene	1000	
benzo(g,n,1) perylene	1000	U
) - Cannot be separated from Diphenylamine		

1F SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

	TE	MINITAFTÄ	IDENTIFIED COMPOUNDS	
				SDAA-4Z
ab	Name: AQUATEC,	INC.	Contract:89150	

Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052

atrix: (soil/water)SOIL Lab Sample ID: 110578

Sample wt/vol: 30.0 (g/mL)G Lab File ID: B110578S

evel: (low/med) LOW Date Received: 02/15/90

Moisture: not dec.37 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

PC Cleanup: (Y/N)Y pH: 6.6 Dilution Factor: 1.0

CONCENTRATION UNITS: Number TICs found: 20 (ug/L or ug/Kg)UG.KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	_ UNKNOWN	4.00	610	=====
1 2.	UNKNOWN	4.83	2800	•
3.123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	5.83		
4	UNKNOWN	8.90	8500	
5.100-52-7	BENZALDEHYDE	10.63	1000	
6	UNKNOWN	11.58	2100	•
7.57-10-3	HEXADECANOIC ACID	29.30	700	
8	UNKNOWN	31.75	2400	
9.	UNKNOWN	35.47	980	
10	UNKNOWN	37.45	750	
44.	UNKNOWN ALIPHATIC HYDROCARBO	37.45	1600	
■ 14.	UNKNOWN ALIPHATIC HYDROCARBO	39.28	2300	
13.	UNKNOWN		2000	
14.	UNKNOWN	42.98	530	
13.	UNKNOWN	43.35	420	
TO.	UNKNOWN	44.08	3300	
■ 1./•	UNKNOWN	44.82	690	
10.	UNKNOWN	45.62	420	
73.	UNKNOWN	46.05	670	
20	UNKNOWN	47.28	680	J į
44.]	47.73	3200	J i
22.				i
23				i
24				i
25.				
40.				
27.				
28.				 ¦
. 29.				
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EPA SAMPLE NO.

SSAA-1

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052

Matrix: (soil/water) SOIL Lab Sample ID: 110579

Sample wt/vol: 30.1 (g/mL)G Lab File ID: B110579S

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec. 5 dec. Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0

CONCENTRATION UNITS:
CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

108-95-2----Phenol 690|U 111-44-4----bis(2-Chloroethyl)ether 690|U

	108-95-2Phenol	690	U	1
١	111-44-4bis(2-Chloroethyl)ether	690	U	ĺ
1	95-57-82-Chlorophenol	690	U	Ì
ĺ	541-73-11,3-Dichlorobenzene	690	U	İ
ĺ	106-46-71,4-Dichlorobenzene	690	U	j
	100-51-6Benzyl alcohol	690	U	i
l	95-50-11,2-Dichlorobenzene	690	U	i
l	95-48-72-Methylphenol	690	U	İ
l	108-60-1bis(2-Chloroisopropyl)ether_	690	įσ	i
l	106-44-54-Methylphenol	690	Ū	i
l	621-64-7N-Nitroso-di-n-propylamine	690	Ü	İ
l	67-72-1Hexachloroethane	690	Ū	İ
l	98-95-3Nitrobenzene	690	U	į
ı	78-59-1Isophorone	690	Ĭ	i
Ĺ	88-75-52-Nitrophenol	690	ט	İ
	105-67-92,4-Dimethylphenol	690		i
l	65-85-0Benzoic acid	3400	ָ ע	İ
l	111-91-1bis(2-Chloroethoxy)methane_	690	U	İ
l	120-83-22,4-Dichlorophenol	690	U	İ
l	120-82-11,2,4-Trichlorobenzene	690	שן	1
l	91-20-3Naphthalene	690	טן	Ì
ļ	106-47-84-Chloroaniline	690	Ü	Ì
ł	87-68-3Hexachlorobutadiene	690	ַ ט	Ì
1	59-50-74-Chloro-3-methylphenol	690	U	Ì
l	91-57-62-Methylnaphthalene	690	Ü	Ì
1	77-47-4Hexachlorocyclopentadiene	690	U	Ì
١	88-06-22,4,6-Trichlorophenol	690	U	İ
Ì	95-95-42,4,5-Trichlorophenol	3400	U	İ
1	91-58-72-Chloronaphthalene	690	U	İ
١	88-74-42-Nitroaniline	3400	U	İ
1	131-11-3Dimethylphthalate	690	U	İ
١	208-96-8Acenaphthylene	690	Ū	i
1	606-20-22,6-Dinitrotoluene	690	U	İ

SSAA-1 Lab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052 Matrix: (soil/water)SOIL Lab Sample ID: 110579 Sample wt/vol: 30.1 (g/mL)GLab File ID: B110579S Level: (low/med) LOW Date Received: 02/15/90 R Moisture: not dec. 5 dec. Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc)_ SONC Date Analyzed: 02/28/90 GPC Cleanup: (Y/N)YpH: 6.7 Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG 0 99-09-2-----3-Nitroaniline_ 83-32-9-----Acenaphthene 3400 U 51-28-5-----2,4-Dinitrophenol_ 690 I U 100-02-7----4-Nitrophenol 3400 U 132-64-9-----Dibenzofuran 3400 U 121-14-2----2,4-Dinitrotoluene 690 | U 84-66-2----Diethylphthalate 690 | U 7005-72-3----4-Chlorophenyl-phenylether 690 U 86-73-7----Fluorene 690 U 100-01-6----4-Nitroaniline 690 U 534-52-1----4,6-Dinitro-2-methylphenol 3400 U 86-30-6----N-Nitrosodiphenylamine (1) 3400 U 101-55-3----4-Bromophenyl-phenylether 690 I U 118-74-1-----Hexachlorobenzene 690 U 87-86-5----Pentachlorophenol 690 U 85-01-8-----Phenanthrene 3400|U 120-12-7-----Anthracene 690 I U 84-74-2----Di-n-butylphthalate_ 690 U 206-44-0-----Fluoranthene 690 U 129-00-0-----Pyrene 690 U 85-68-7-----Butylbenzylphthalate 690 U 91-94-1----3,3'-Dichlorobenzidine 690 U 56-55-3----Benzo(a) anthracene 1400|U 218-01-9-----Chrysene 690 U 117-81-7-----bis(2-Ethylhexyl)phthalate_ 690 U 117-84-0----Di-n-octylphthalate 690 U 205-99-2----Benzo(b) fluoranthene 690 U 207-08-9----Benzo(k) fluoranthene 690 U 50-32-8-----Benzo(a) pyrene 690 U 193-39-5----Indeno(1,2,3-cd)pyrene_ 690 I U 53-70-3-----Dibenz(a,h)anthracene 690 U

191-24-2----Benzo(g,h,i)perylene__

(1) - Cannot be separated from Diphenylamine

690 U 690 U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

	T	ENTATIVELY	IDENTIFIED	COMPOUNDS	1	
			•		i	SSAA-1
Lab	Name: AQUATEC,	INC.	Cc	ntract:8915	50 i	_

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110579

Sample wt/vol: 30.1 (g/mL)G Lab File ID: B110579S

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec. 5 dec. ____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0

Number TICs found: 9 CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	1 0
1. 2.123-42-2 3. 4.100-52-7 5. 6.57-10-3 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25.	UNKNOWN 2-PENTANONE, 4-HYDROXY-4-MET UNKNOWN BENZALDEHYDE UNKNOWN HEXADECANOIC ACID UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN ALIPHATIC HYDROCARBO	4.85 5.87 8.87 10.58 11.57 29.25 39.25	EST. CONC. 1100 4100 580 910 360 470 570 1300 450	JBA JB JB JB JB J
44.				

SSAA-2 Lab Name: AQUATEC, INC. Contract:89150 Case No.: 20181 SAS No.: _____ SDG No.: 11052 Lab Code: AQUAI Matrix: (soil/water)SOIL Lab Sample ID: 110580 Sample wt/vol: 30.5 (g/mL)GLab File ID: B110580S Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.15 dec. Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc)_ SONC Date Analyzed: 02/28/90 SPC Cleanup: (Y/N)Y pH: 6.1 Dilution Factor: CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 108-95-2----Phenol 760|U 111-44-4----bis(2-Chloroethyl)ether 760 | U 95-57-8----2-Chlorophenol 760 I U 541-73-1----1,3-Dichlorobenzene 760 U 106-46-7-----1,4-Dichlorobenzene 100-51-6----Benzyl alcohol 760 U 95-50-1----1,2-Dichlorobenzene 760 U 95-48-7----2-Methylphenol 760 J U 760 U 108-60-1-----bis(2-Chloroisopropyl)ether 106-44-5----4-Methylphenol 760 | U 621-64-7----N-Nitroso-di-n-propylamine 760 U 67-72-1-----Hexachloroethane__ 760 | U 98-95-3----Nitrobenzene 760 U 78-59-1-----Isophorone 760 I U 88-75-5----2-Nitrophenol 760 I U 105-67-9----2,4-Dimethylphenol_ 760 U 65-85-0----Benzoic acid 760 U 111-91-1----bis(2-Chloroethoxy)methane 3700|U 120-83-2----2,4-Dichlorophenol 760 U 120-82-1----1,2,4-Trichlorobenzene_ 760|0 91-20-3----Naphthalene 760 U 106-47-8----4-Chloroaniline 760 U 87-68-3-----Hexachlorobutadiene 760 U 59-50-7----4-Chloro-3-methylphenol_ 760 I U 91-57-6----2-Methylnaphthalene 760 U 77-47-4----Hexachlorocyclopentadiene 760 U 88-06-2----2,4,6-Trichlorophenol 760 U 95-95-4----2,4,5-Trichlorophenol____ 760 | U 91-58-7----2-Chloronaphthalene___ 370010 88-74-4----2-Nitroaniline 760 U 131-11-3-----Dimethylphthalate_ 3700 | U 208-96-8-----Acenaphthylene 76010 606-20-2----2,6-Dinitrotoluene 760 U 760 JU

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110580

Sample wt/vol: 30.5 (g/mL)G Lab File ID: B110580S

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.15 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.1 Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG O

		¥
99-09-23-Nitroaniline	 	
83-32-9Acenaphthene	760111	
51-28-52.4-Dinitropheno	1 760 U	
100-02-74-Nitrophenol	3700 U	
132-64-9Dibenzofuran	760117	
121-14-22.4-Dinitrotolue	7601	
84-66-2Diethylphthalate	76017	
7005-72-34-Chlorophenvl-pi	henylether 760 U	
80-/3-/Fluorene	760 U	
100-01-64-Nitroaniline	1 2700 177	
534-52-14.6-Dinitro-2-med	thulphonol	
80-30-6N-Nitrosodinhenv	lamina /1_i = =coint	
101-33-34-Bromophenvl-ph	enviether 760in	
110 /4 1 1 Hexachlorobenzen	9 760177	
87-86-5Pentachloropheno	1 3700 U	
85-01-8Phenanthrene	760 U	
120-12-7Anthracene	760177	
84-74-2Di-n-butylphthala	760 U	
206-44-0Fluoranthene	760 U	
129-00-0Pyrene		
85-68-7Rutvlhengylnhthal		
71-74-13.3'-Dichlorobons	ridino	
³⁰⁻³³⁻³ Benzo(a)anthracer	ne 760 U	
218-01-9Chrvsene	76017	
117-81-7bis/2-Ethylheyul)	nhthalato	
L1/-04-UD1-n-octv nhthals	2 to 2 to 2 to 2 to 2 to 2 to 2 to 2 to	
205-99-2Benzo(b) fluoranth	1979	
40/=08=9======Benzo(k) fluoranth	nene 760 U	
00-32-8Benzo(a)pyrene	760111	
193-39-5Indeno(1,2,3-cd)r	760 U	
03-70-3Dibenz(a.h\anthra	CARA	
191-24-2Benzo(g,h,i)peryl	icene 760 U	
	lene 760 U	
- Cannot be separated from Diph	enviamine	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

	•			SSAA-2
Lab	Name: AQUATEC,	INC.	Contract:89150	

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110580

Sample wt/vol: 30.5 (g/mL)G Lab File ID: B110580S

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec.15 dec.____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.1 Dilution Factor: 1.0

CONCENTRATION UNITS:

Number TICs found: 11 CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	 Q
1. 2.123-2-2 3. 4.57-10-3 5. 6. 7. 8. 9.	UNKNOWN 2-PENTANONE, 4-HYDROXY-4-MET UNKNOWN HEXADECANOIC ACID UNKNOWN UNKNOWN LIPHATIC HYDROCARBO	4.82 5.82 8.85 29.22 37.38 39.23 40.50 40.93	PST. CONC. 950 4500 520 350 850 1700 370 2500 680 590 1200	 JB

Lab Name: AQUATEC, INC.

Contract:89150

SSAA-3

Matrix: (soil/water)SOIL

Lab Sample ID: 110581

Sample wt/vol: 31.1 (g/mL)G

Lab File ID: B110581S

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec. 0 dec. ____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)_ SONC

Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 5.9

Dilution Factor: 1.0

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

Q

*. = 7.2.2			
108-95-2	Phenol	640	 TT
111-44-4	bis(2-Chloroethyl)ether	640	•
95-57-8	2-Chlorophenol	640	•
541-73-1	1,3-Dichlorobenzene	640	•
106-46-7	1,4-Dichlorobenzene	640	•
100-51-6	Benzyl alcohol	640	
95-50-1	1,2-Dichlorobenzene	640	•
95-48-7	2-Methylphenol	640	•
108-60-1	bis(2-Chloroisopropyl)ether	640	•
106-44-5	4-Methylphenol	640	•
621-64-7	N-Nitroso-di-n-propylamine	640	•
67-72-1	Hexachloroethane	640	•
98-95-3	Nitrobenzene	640	, –
78-59-1	Isophorone	640	•
88-75-5	2-Nitrophenol	640	
105-67-9	2,4-Dimethylphenol	640	
65-85-0	Benzoic acid	3100	, -
111-91-1	bis(2-Chloroethoxy) methane	640	•
120-83-2	2,4-Dichlorophenol	640	
120-82-1	1,2,4-Trichlorobenzene	640	
91-20-3	Naphthalene	640	
106-47-8	4-Chloroaniline	640	
87-68-3	Hexachlorobutadiene	640	•
59-50-7	4-Chloro-3-methylphenol	640	•
91-57-6	2-Methylnaphthalene	640	•
77-47-4	Hexachlorocyclopentadiene	640	•
88-06-2	2.4.6-Trichlorophenol	640	•
95-95-4	2.4.5-Trichlorophenol	3100	
91-58-7	2-Chloronaphthalene	640	
88-74-4	2-Nitroaniline	1	
131-11-3	Dimethylphthalate	3100	•
208-96-8	Acenaphthylene	640	_
606-20-2	2,6-Dinitrotoluene	640	
	-10 211111101011111111111111111111111111	640	U
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EPA SAMPLE NO.

SSAA-3 Lab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052 Matrix: (soil/water)SOIL Lab Sample ID: 110581 Sample wt/vol: 31.1 (g/mL)GLab File ID: B110581S Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec. 0 dec. Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc)_ SONC Date Analyzed: 02/28/90 GPC Cleanup: (Y/N)Y pH: 5.9 Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 99-09-2----3-Nitroaniline__ 3100|U 83-32-9----Acenaphthene 640 U 51-28-5----2,4-Dinitrophenol___ 3100 U | 100-02-7----4-Nitrophenol_ 3100 U 132-64-9-----Dibenzofuran 121-14-2----2,4-Dinitrotoluene 640 | U 84-66-2----Diethylphthalate 640 U 7005-72-3----4-Chlorophenyl-phenylether 640 U 640 U | 86-73-7----Fluorene 100-01-6----4-Nitroaniline 640 U 534-52-1----4,6-Dinitro-2-methylphenol 3100 U 86-30-6----N-Nitrosodiphenylamine (1) 3100 U 101-55-3----4-Bromophenyl-phenylether 640 | U 118-74-1-----Hexachlorobenzene 640 U 87-86-5----Pentachlorophenol_ 640 U 85-01-8-----Phenanthrene 3100 | U 120-12-7-----Anthracene 640 U 84-74-2----Di-n-butylphthalate____ 640 | U 206-44-0----Fluoranthene 640 U 129-00-0----Pyrene 640 U 85-68-7-----Butylbenzylphthalate_ 640 U 91-94-1----3,3'-Dichlorobenzidine 640 | U 56-55-3----Benzo(a) anthracene 1300 U 218-01-9-----Chrysene 640 | U 117-81-7-----bis(2-Ethylhexyl)phthalate_ 640 U 117-84-0-----Di-n-octylphthalate 640|U 205-99-2----Benzo(b) fluoranthene 640 U 207-08-9----Benzo(k) fluoranthene 640 | U 50-32-8-----Benzo(a)pyrene 640 | U 193-39-5----Indeno(1,2,3-cd)pyrene_ 640 | U 53-70-3-----Dibenz(a,h)anthracene 640 U 191-24-2----Benzo(g,h,i)perylene____ 640 U 640 | U

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: AQUATEC, INC.

Contract:89150

SSAA-3	1
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EPA SAMPLE NO.

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110581

Sample wt/vol: 31.1 (g/mL)G

Lab File ID: B110581S

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec. 0 dec. Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 5.9

Dilution Factor: 1.0

Number TICs found: 7

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

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CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
1	UNKNOWN	4.83	710	
2.123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	5.87	3000	
3	UNKNOWN	8.88	410	
4	UNKNOWN ALIPHATIC HYDROCARBO	37.45	370	
5	UNKNOWN	39.32	1200	
6. <u></u>	UNKNOWN	41.08	520	
/ •	UNKNOWN	44.07	390	•
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9	·			
TO.			·	
11.			i — .	
13.			<u> </u>	
14.	i -			
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10	· i			
47•	1			
20				
21 _				
44	1			
23.				
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23.				
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29		 :		
30		 		
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SSAA-4 ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052 fatrix: (soil/water)SOIL Lab Sample ID: 110582 Sample wt/vol: 30.1 (g/mL)GLab File ID: B110582S Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec. 7 dec. Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc)_ SONC Date Analyzed: 02/28/90 GPC Cleanup: (Y/N)YpH: 5.7 Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG 108-95-2----Phenol 710 0 111-44-4----bis(2-Chloroethyl)ether_ 710 U 95-57-8----2-Chlorophenol 710|0 541-73-1----1,3-Dichlorobenzene 710|0 106-46-7----1,4-Dichlorobenzene 100-51-6-----Benzyl alcohol 710 | U 95-50-1-----1,2-Dichlorobenzene_ 71010 95-48-7----2-Methylphenol 710 | U 710 | U 108-60-1----bis(2-Chloroisopropyl)ether_ 106-44-5----4-Methylphenol 710 | 0 621-64-7----N-Nitroso-di-n-propylamine 710 U 67-72-1-----Hexachloroethane 710|0 98-95-3----Nitrobenzene 710 | 0 78-59-1-----Isophorone 710 | U 710|U 88-75-5----2-Nitrophenol 105-67-9----2,4-Dimethylphenol_ 71010 65-85-0-----Benzoic acid 710|0 111-91-1-----bis(2-Chloroethoxy)methane 3400 U 120-83-2----2,4-Dichlorophenol 710|U 120-82-1-----1,2,4-Trichlorobenzene 710 0 91-20-3----Naphthalene 710 | U 106-47-8----4-Chloroaniline 710|0 87-68-3-----Hexachlorobutadiene 710 | U 59-50-7----4-Chloro-3-methylphenol 710 0 91-57-6----2-Methylnaphthalene 710 U 77-47-4-----Hexachlorocyclopentadiene_ 710|0 88-06-2----2,4,6-Trichlorophenol 71010 95-95-4----2,4,5-Trichlorophenol_ 71010 91-58-7----2-Chloronaphthalene___ 3400 | U 88-74-4----2-Nitroaniline 710|0 131-11-3-----Dimethylphthalate_ 3400 U 208-96-8-----Acenaphthylene 710 0 606-20-2----2,6-Dinitrotoluene_

710 | U 71010 Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110582

Sample wt/vol: 30.1 (g/mL)G Lab File ID: B110582S

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec. 7 dec. Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 5.7 Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG

99-09-2----3-Nitroaniline__ 3400 | U 83-32-9-----Acenaphthene 710 U 51-28-5----2,4-Dinitrophenol 3400 | U 100-02-7----4-Nitrophenol 3400 U 132-64-9-----Dibenzofuran 710 | U 121-14-2----2, 4-Dinitrotoluene 710 | 0 84-66-2----Diethylphthalate 710 I U 7005-72-3----4-Chlorophenyl-phenylether 710 0 86-73-7----Fluorene 710 | U 100-01-6----4-Nitroaniline 3400 | U 534-52-1----4,6-Dinitro-2-methylphenol_ 3400 U 86-30-6----N-Nitrosodiphenylamine (1) 710 | U 101-55-3----4-Bromophenyl-phenylether_ 710 I U 118-74-1-----Hexachlorobenzene 710 | U 87-86-5-----Pentachlorophenol 3400 | U 85-01-8-----Phenanthrene 710 U 120-12-7-----Anthracene 710 | 0 84-74-2----Di-n-butylphthalate 710 U 206-44-0----Fluoranthene 710 | U 129-00-0-----Pyrene 710|U 85-68-7-----Butylbenzylphthalate 710 | 0 91-94-1----3,3'-Dichlorobenzidine_ 1400 J U 56-55-3-----Benzo(a)anthracene_ 710 | U 218-01-9-----Chrysene 71010 117-81-7----bis(2-Ethylhexyl)phthalate 710 | U 117-84-0-----Di-n-octylphthalate 71010 205-99-2----Benzo(b) fluoranthene 710 IU 207-08-9----Benzo(k) fluoranthene 710|U 50-32-8-----Benzo(a)pyrene 710 T 193-39-5----Indeno(1,2,3-cd)pyrene 710|U 53-70-3-----Dibenz(a,h)anthracene_ 710 I U 191-24-2----Benzo(g,h,i)perylene__ 710|0 (1) - Cannot be separated from Diphenylamine

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY	COMPOUNDS	1
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ab Name:AQUATEC, INC. Contract:89150

| SSAA-4

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110582

Sample wt/vol: 30.1 (g/mL)G

Lab File ID: B110582S

Level: (low/med) LOW

Date Received: 02/15/90

Moisture: not dec. 7 dec.____

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)_ SONC

Date Analyzed: 02/28/90

PC Cleanup: (Y/N)Y pH: 5.7 Dilution Factor: 1.0

Number TICs found: 16

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	 Q
13. 14. 15.	UNKNOWN 2-PENTANONE, 4-HYDROXY-4-MET UNKNOWN UNKNOWN UNKNOWN UNKNOWN ALIPHATIC HYDROCARBO UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN	8.90 11.58 37.40 38.72	1000 4500 570 330 780 560 1400 2400 340 590 700 610 350 610 3000 380	JBA JB JB J J J J J J J J

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: BB0222FIS

Sample wt/vol: 30.0 (g/mL)G Lab File ID: BB0222FIS

Level: (low/med) LOW Date Received: 00/00/00

% Moisture: not dec. 0 dec. Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc)_ SONC Date Analyzed: 02/27/90

GPC Cleanup: (Y/N)Y pH:___ Dilution Factor: 1.0

CONCENTRATION UNITS:

(ug/L or ug/Kg)UG/KG

CAS NO.	(ug/L or ug	g/ kg) ug/ kg	Q
108-95-2	Phenol	660	l U
111-44-4	bis(2-Chloroethyl)ether	660	•
95-57-8	2-Chlorophenol	_i 660	•
541-73-1	1.3-Dichlorobenzene	660	
106-46-7	1.4-Dichlorobenzene	_i 660	
100-51-6	Benzvl alcohol	660	•
95-50-1	1,2-Dichlorobenzene	660	•
95-48-7	2-Methylphenol	660	•
108-60-1	bis(2-Chloroisopropyl)ether	660	•
106-44-5	4-Methylphenol	660	•
621-64-7	N-Nitroso-di-n-propylamine	660	
67-72-1	Hexachloroethane	660	
98-95-3	Nitrobenzene	660	
78-59-1	Isophorone	660	
88-75-5	2-Nitrophenol	660	•
105-67-9	2,4-Dimethylphenol	660	•
65-85-0	Benzoic acid	3200	
111-91-1	bis(2-Chloroethoxy)methane	660	
120-83-2	2.4-Dichlorophenol	660	•
120-82-1	1.2.4-Trichlorohenzene	660	•
91-20-3	Naphthalene	660	
106-47-8	4-Chloroaniline	660	•
87-68-3	Hexachlorobutadiene	660	•
59-50-7	4-Chloro-3-methylphenol	660	•
91-57-6	2-Methylnanhthalene	660	
//-47-4	Hexachlorocyclopentadiene	660	
88-06-2	2.4.6-Trichlorophenol	- ·	
Y5-Y5-4	2.4.5-Trichlorophenol	.l 660	
91-58-7	2-Chloronaphthalene	3200	
88-74-4	2-Nitroaniline	660	
131-11-3	Dimethylphthalate	3200	
	Acenaphthylene	660	
606-20-2	2,6-Dinitrotoluene	660	
	r, o_printcrocordene	. 660	U
		.!	

Lab Name: AQUATEC, INC. Contract: 89150	SBLKF1
Lab Code: AQUAI Case No.: 20181 SAS No.:	SDG No.: 11052
Matrix: (soil/water)SOIL Lab Sa	ample ID: BB0222FIS
Sample wt/vol: 30.0 (g/mL)G Lab Fi	ile ID: BB0222FIS
Level: (low/med) LOW Date F	Received: 00/00/00
Moisture: not dec. 0 dec Date H	Extracted: 02/22/90
Extraction: (SepF/Cont/Sonc)_ SONC Date A	Analyzed: 02/27/90
PC Cleanup: (Y/N)Y pH: Diluti	on Factor: 1.0
CONCENTRATIO	ON UNITS:
CAS NO. COMPOUND (ug/L or ug/	
99-09-23-Nitroaniline	3200 U
83-32-9Acenaphthene 51-28-52,4-Dinitrophenol	660 U
100-02-74-Nitrophenol	3200 U
132-64-9Dibenzofuran	3200 0
121-14-22,4-Dinitrotoluene	660 U
84-60-2Diethylphthalate	660 U
/005-72-34-Chlorophenvl-phenvlethor	660 U
00-/3-/Fluorene	660 U
100-01-64-Nitroaniline	660 U 3200 U
534-52-1 6-Dini+vo-2	3200 U
	660 U
+V+-JJ-J	660 U
TTO TTTTTTTTTTTTMEXACTION OF CONCORD	660 0
87-86-5Pentachlorophenol	3200 U
85-01-8Phenanthrene	660 U
120-12-7Anthracene	660 U
84-74-2Di-n-butylphthalate	660 U
129-00-0Pyrene	660 U
85-68-7Butylbenzylphthalate	660 U
	660 U
· · · · · · · · · · · · · · · · · · ·	1300 U
210 01 77 77 77 77 77 77 77 77 77 77 77 77 77	660 บ
11/-81-7	660 U
	660 U
UUJ JJ Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	660 U
20/ UU-J-T-T-T-HAKAN7A/U\&IIIAAAAAA	660 U
	660 U
	660 U
UU /U U U U U U U U U	660 U
Benzo(g,n,1)perylene	660 U 660 U
(1) - Cannot be separated from Diphenylamine	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

			· · · · · · · · · · · · · · · · · · ·	
Lab	Name: AQUATEC,	INC.	Contract:89150	SBLKF1

Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052

Matrix: (soil/water) SOIL Lab Sample ID: BB0222FIS

Sample wt/vol: 30.0 (g/mL)G Lab File ID: BB0222FIS

Level: (low/med) LOW Date Received: 00/00/00

% Moisture: not dec. 0 dec. Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/27/90

GPC Cleanup: (Y/N)Y pH:___ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

Number TICs found: 7

				
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	_
1	UNKNOWN	4.00	410	
2. 3.123-42-2	UNKNOWN	4.83	1600	
	2-PENTANONE, 4-HYDROXY-4-MET	5.82	9600	
4. 5.100-52-7	_ UNKNOWN	8.87		
	BENZALDEHYDE	10.60	810	
6	UNKNOWN	11.57	760	
7.57-10-3	HEXADECANOIC ACID	29.28	490	
8		23.20	720	J
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L2 •				
13.		!		
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13.		!		<u> </u>
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17.		!		
18.		!		
L9.				
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23.				
24.	-	ļ		
.5.	-	l.		
6				
7.				
27. 28.	-			
9				
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Lab Name: AQUATEC, INC.

Contract:89150

SSAA-1MS

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110579MS

Sample wt/vol: 30.2 (g/mL)G Lab File ID: B110579MSS

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec. 5 dec. ____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

108-95-2Phenol		1
111-44-4his/2-Chlorosthullath		.
33-3/-0	_ 690	ן ט
341-/3-11 3-Dichloseh		.
100-40-/	_ 690	U
100-31-6		1
70-00-1	690	
JJ-40-/	_] 690	U
100-00-1	_ 690	Ü
	. 690	U
041-04-/N-Nitroge 44	_l 690	U
		İ
98-95-3Nitrobenzene	690	Ū
78-59-1Isophorone	. 690	
00*/5=5=======0-Ni+====================================	690	
105-67-92,4-Dimethylphenol_	690	
65-85-0Benzoic acid	690	
111-91-1	3300	
111-91-1bis(2-Chloroethoxy)methane 120-83-22,4-Dichlorophenol	690	
	690	
120-82-11,2,4-Trichlorobenzene 91-20-3Naphthalene	i	
	690	77
106-47-84-Chloroaniline	690	
87-68-3Hexachlorobutadiene	6901	
59-50-74-Chloro-3-methylphenol	1	٠ !
	690	,, !
88-06-2,4,6-Trichlorophenol	690	
	690]	
	3300	
	690	
+3+=1+=3=====Dimo+b1	3300 1	
	690 1	
606-20-22,6-Dinitrotoluene	690 1	
	690 1	י די
		i

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: AQUATEC, INC. Contract: 89150 SSAA-1MS

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110579MS

Sample wt/vol: 30.2 (g/mL)G Lab File ID: B110579MSS

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec. 5 dec. ____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

99-09-23-Nitroaniline	 3300	
83-32-9Acenanhthene	.1 3300	10
51-28-52.4-Dinitrophenol	3300	¦
100-02-74-Nitrophenol	1 3300	1
132-64-9Dibenzofuran	690	¦
121-14-22.4-Dinitrotolyene	1 050	10
84-66-2Diethylphthalate	690	177
/005-/2-34-Chlorophenyl-phenylether	690	
80-/3-/Fluorene	690	
100-01-64-Nitroaniline	i 3300	
534-52-14.6-Dinitro-2-methylaboral	3300	•
00-JU-0N-Nitrosodinhenulamina /1)	690	•
TUITOOTJETTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT		
1107/471777777PHEYAChlorobenzene	690	•
87-86-5Pentachlorophenol	690	ļ
85-01-8Phenanthrone	600	!
120-12-7Anthracene	690	•
84-74-2Di-n-butylphthalate	690	•
206-44-0Fluoranthene	690	•.
129-00-0Pyrene	690	U
85-68-7Butylhenzylnhthalate	690	-
Jimpaniaina		
Jo-JJ-JBenzo(a) anthracene	1400	
218-01-9Chrysene	690	
117-81-7hig/2-Fthy/housellabeth-1	690	
	690	
4UDTYYTZTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	690	
20/TUOTYTTTTTTTBBNZO/k) fluoranthana	690	
JU-32-8	690	
193-39-5Indeno(1,2,3-cd)pyrene	690	
53-70-3Dibenz(a,h)anthracene	690	
191-24-2	690	
191-24-2Benzo(g,h,i)perylene	690	U
) - Cannot be separated from Diphenylamine	l	

Lab Name: AQUATEC, INC. Contract:89150

SSAA-1MSD

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110579MD Sample wt/vol: 30.0 (g/mL)G

Lab File ID: B110579MDS Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec. 5 dec. ____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG

108-95-2Phenol		1
111-44-4		!
// J/ = 0 = = = = = = / = (690	וט
041-/3-11 3-Dighlorehan	· 	
100-40-/	690	וט
TUUTDITOTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT		I
70-00-1	690	
70-40-/	690	
100-00-1	690	
106-44-54-Methylphenol	690	U
621-64-7N-Nitroso-di-n-propylamine	690	U
67-72-1Hexachloroethane		Ì
98-95-3Nitrobenzene	690	i u
78-59-1Isophorone	690	
88-75-5	690	
88-75-52-Nitrophenol	690	
105-67-92,4-Dimethylphenol	690	
UUTOUTUTEEEEEEEEEEAAAAAA aasid	3400	
111-91-1bis(2-Chloroethoxy)methane		
120-83-22,4-Dichlorophenol	690	
	690	U
	600	
100-4/-8	690	
0/-00-1	690	
//	690	U
	690	
88-06-22,4,6-Trichlorophenol	690	
	690	
	3400	U
	690	
LJ 1 = 1 = 1 = 0 = 0 = 0 = 0 = 0 = 0 = 0 =	3400	
, VU	690	_
506-20-22,6-Dinitrotoluene	690	
		_

SSAA-1MSD

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL Lab Sample ID: 110579MD

Sample wt/vol: 30.0 (g/mL)G Lab File ID: B110579MDS

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec. 5 dec.___ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc). SONC Date Analyzed: 02/28/90

GPC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q

99-09-23-Nitroaniline	3400	បៃ
83-32-9Acenaphthene		i
51-28-52,4-Dinitrophenol	3400	ប៊
100-02-74-Nitrophenol		i
132-64-9Dibenzofuran	690	បោ
121-14-22,4-Dinitrotoluene		i
84-66-2Diethylphthalate	690	Ü
7005-72-34-Chlorophenyl-phenylether	690	
86-73-7Fluorene	690	
100-01-64-Nitroaniline	3400	
534-52-14,6-Dinitro-2-methylphenol	3400	•
86-30-6N-Nitrosodiphenylamine (1)	690	
101-55-34-Bromophenvl-phenvlether	690	
118-74-1Hexachlorobenzene	690	•
87-86-5Pentachlorophenol		i
85-01-8Phenanthrene	690	iŪ
120-12-7Anthracene	690	•
84-74-2Di-n-butylphthalate	690	•
206-44-0Fluoranthene	690	•
129-00-0Pyrene		į
85-68-7Butylbenzylphthalate	690	Ū
91-94-13,3'-Dichlorobenzidine	1400	ับ
56-55-3Benzo(a)anthracene	690	iυ
218-01-9Chrysene	690	Ū
117-81-7bis(2-Ethylhexyl)phthalate	690	
117-84-0Di-n-octvlphthalate	690	
205-99-2Benzo(b) fluoranthene	690	•
20/-08-9Benzo(k) fluoranthene	690	•
50-32-8Benzo(a)pyrene	690	
193-39-5Indeno(1.2.3-cd)nyrene	690	•
53-70-3Dibenz(a.h)anthracene	690	,
191-24-2Benzo(g,h,i)perylene	690	

SLUDGE#1 ab Name: AQUATEC, INC. Contract:89150 Case No.: 20181 SAS No.: SDG No.: 11052 Lab Code: AQUAI Matrix: (soil/water)SOIL Lab Sample ID: 110525 Sample wt/vol: 30.1 (g/mL)G Lab File ID: Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.89 dec.__ Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/02/90 PC Cleanup: (Y/N)Y pH: 6.8 Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG 319-84-6----alpha-BHC 140 U 319-85-7----beta-BHC 140 | U 319-86-8-----delta-BHC 140 U 58-89-9-----gamma-BHC (Lindane) 140 U 76-44-8-----Heptachlor 140 U 309-00-2-----Aldrin 140 U 1024-57-3-----Heptachlor epoxide 140 U 959-98-8-----Endosulfan I 140 U 60-57-1-----Dieldrin 290 | U 72-55-9----4,4'-DDE 290 I U 72-20-8-----Endrin 290 U 33213-65-9----Endosulfan II 290 U 1 72-54-8-----4,4'-DDD 290 U 1031-07-8----Endosulfan sulfate 290 | U 50-29-3----4,4'-DDT 290 U 72-43-5-----Methoxychlor 1400 U 53494-70-5----Endrin ketone 290 U 5103-71-9----alpha-Chlordane 1400 | U 5103-74-2----gamma-Chlordane 1400 U 8001-35-2----Toxaphene 2900|U 12674-11-2----Aroclor-1016 1400 | U 11104-28-2----Aroclor-1221 1400 | U 11141-16-5-----Aroclor-1232 1400 | U 53469-21-9----Aroclor-1242 1400 | U 12672-29-6----Aroclor-1248 1400 U 11097-69-1----Aroclor-1254

11096-82-5----Aroclor-1260

2900 U

2900 U

SLUDGE #2 Lab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052 Matrix: (soil/water)SOIL Lab Sample ID: 110526 30.0 (g/mL)GSample wt/vol: Lab File ID: Level: (low/med) LOW Date Received: 02/15/90 % Moisture: not dec.78 dec. Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/01/90 GPC Cleanup: (Y/N)Y pH: 7.0 Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 319-84-6-----alpha-BHC 73 | Ü 319-85-7----beta-BHC 73 | U $319-86-8-----delta-BH\overline{C}$ 73 | U 58-89-9-----gamma-BHC (Lindane) 73 I U 76-44-8-----Heptachlor 73 U 309-00-2-----Aldrin 73 | U 1024-57-3-----Heptachlor epoxide 73 | U 959-98-8-----Endosulfan I 73 | U | 60-57-1-----Dieldrin 150 | U 72-55-9----4,4'-DDE 150 U 72-20-8-----Endrin 150 | U 33213-65-9----Endosulfan II 150 | U 72-54-8-----4,4'-DDD 150 U 1031-07-8----Endosulfan sulfate 150 U | 50-29-3----4,4'-DDT 150 U 72-43-5----Methoxychlor 730 U 53494-70-5----Endrin ketone 150 U 5103-71-9-----alpha-Chlordane_ 730|0 5103-74-2----gamma-Chlordane 730 | U | 8001-35-2----Toxaphene 1500 U 12674-11-2----Aroclor-1016 73010

11104-28-2----Aroclor-1221

11141-16-5-----Aroclor-1232

53469-21-9----Aroclor-1242

12672-29-6-----Aroclor-1248

11097-69-1-----Aroclor-1254

11096-82-5-----Aroclor-1260

730 I T

730 U

730 U

730 U

930|Y

1500 U

SLUDGE #3

ab Name: AQUATEC, INC. Contract:89150 Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052 atrix: (soil/water)SOIL Lab Sample ID: 110527 Sample wt/vol: 30.0 (g/mL)G Lab File ID: evel: (low/med) LOW Date Received: 02/15/90 Moisture: not dec.92 dec. Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc)_ SONC Date Analyzed: 03/02/90 PC Cleanup: (Y/N)Y pH: 6.6 Dilution Factor: 1.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 319-84-6-----alpha-BHC 200|U 319-85-7----beta-BHC 200 U 319-86-8-----delta-BHC 200 U 58-89-9-----gamma-BHC (Lindane)____ 200 U 76-44-8-----Heptachlor_ 200 U 309-00-2----Aldrin 1024-57-3-----Heptachlor epoxide 200 U 959-98-8-----Endosulfan I 200 U 200 I U 60-57-1-----Dieldrin 400 | U 72-55-9----4,4'-DDE 400 U 72-20-8-----Endrin 400 U 33213-65-9----Endosulfan II 400 | U 72-54-8-----4,4'-DDD 1031-07-8-----Endosulfan sulfate 400 U 400 | U 50-29-3----4,4'-DDT 72-43-5----Methoxychlor 400 U 53494-70-5----Endrin ketone 2000|U 5103-71-9----alpha-Chlordane 400 U 5103-74-2----gamma-Chlordane_ 2000 10 8001-35-2-----Ťoxaphene 2000 | U | 12674-11-2----Aroclor-1016 4000 U 11104-28-2----Aroclor-1221 200010 11141-16-5-----Aroclor-1232 2000 U 53469-21-9----Aroclor-1242 2000 U 12672-29-6-----Aroclor-1248 2000 U 11097-69-1----Aroclor-1254 2000 U 11096-82-5-----Aroclor-1260_ 4000 U 4000 U

EPA SAMPLE NO.

| SLUDGE #4

Lab Name: AQUATEC, INC.

Contract:89150

Lab Code: AQUAI Case No.: 20181 SAS No.: _____ SDG No.: 11052

Matrix: (soil/water)SOIL

Lab Sample ID: 110528

Sample wt/vol: 30.1 (g/mL)G Lab File ID:

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.79 dec.____

Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) - SONC

Date Analyzed: 03/02/90

GPC Cleanup: (Y/N)Y pH: 6.4 Dilution Factor: 1.0

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG

Q

319-84-6alpha-BHC	76	l I U
319-85-7beta-BHC	76	•
319-86-8delta-BHC	76	•
58-89-9gamma-BHC (Lindane)	76	•
76-44-8Heptachlor	76	•
309-00-2Aldrin	76	•
1024-57-3Heptachlor epoxide	i 76	•
959-98-8Endosulfan I	76	•
60-57-1Dieldrin	150	•
72-55-94,4'-DDE	150	
72-20-8Endrin	150	•
33213-65-9Endosulfan II	i 150	•
72-54-84,4'-DDD	150	•
1031-07-8Endosulfan sulfate		
50-29-34,4'-DDT	150	
72-43-5Methoxychlor	760	•
53494-70-5Endrin ketone	i	
5103-71-9alpha-Chlordane	760	•
5103-74-2gamma-Chlordane	760	•
8001-35-2Toxaphene	1500	•
12674-11-2Aroclor-1016	760	•
11104-28-2Aroclor-1221	760	•
11141-16-5Aroclor-1232	760	•
53469-21-9Aroclor-1242	760	•
12672-29-6Aroclor-1248	760	•
11097-69-1Aroclor-1254	1500	
11096-82-5Aroclor-1260	1500 1500	•
	1	ll

ab Name: AQUATEC, INC.	Contract:89150	SDAA-3
Lab Code: AQUAI Case No.: 201	81 SAS No.: SDG	No.: 11052
Matrix: (soil/water)SOIL	Lab Sample ID:	110577
Sample wt/vol: 31.0 (g/mL)	G Lab File ID:	
Level: (low/med) LOW	Date Received:	02/15/90
Moisture: not dec.13 dec.	Date Extracted	: 02/22/90
Extraction: (SepF/Cont/Sonc).	•	•
PC Cleanup: (Y/N)Y pH:	7.3 Dilution Factor	r: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG	Q
319-84-6alpha-BHC_		18 U
319-85-7beta-BHC		18 U
319-86-8delta-BHC		18 0
58-89-9gamma-BHC	(Lindane)	18 Ü
76-44-8Heptachlor		18 U
1024-57-3Heptachlor		18 U
	epox1de	18 0
60-57-1Dieldrin	-	18 U
72-55-94,4'-DDE		36 U
/2-20-8		36 U
33213-65-9Endosulfan	TT	36 U
/ /2~34~8~~~~~~~ <i>A</i> /÷DDD		36 U
1031-07-8Fndogulfan	sul fate	36 U
I JUTAJTJETTTTTA AILEDDM		36 U
/2-43-5Methovich1	or	36 U
JJ4747/U-5Endrin bat	080	180 U
5103-71-9alpha-Chlo	rdane	36 U
- コーレンコー・4 マイニャーニーニーの2 777 3 - 7 - 7	rdane	180 U
OUUL-JO-2TOYADhene		180 0
1 440/4-11-2Aroclov-10:	16	360 U
11104-28-2Aroclas-13	21	180 U
	2 2	180 U
03469-21-9Aroclor-12	4 2	180 U
12672-29-6Aroclor-12	4.0	180 U
! 1109/-69-1Aroclas-126	5 A	180 U
11096-82-5Aroclor-126	60	360 U
1	/U	360177

EPA SAMPLE NO.

SDAA-47

Lab Name: AQUATEC, INC. Contract: 89150

Lab Code: AQUAI Case No.: 20181 SAS No.: SDG No.: 11052

Matrix: (soil/water) SOIL

Lab Sample ID: 110578

Sample wt/vol: 30.0 (g/mL)G

Lab File ID:

Level: (low/med) LOW

Date Received: 02/15/90

% Moisture: not dec.37 dec._____ Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) - SONC

Date Analyzed: 03/02/90

GPC Cleanup: (Y/N)Y pH: 6.6

Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg)UG/KG

319-84-6alpha-BHC	25	ប
319-85-7beta-BHC	25	Ū
319-86-8delta-BHC	25	•
58-89-9gamma-BHC (Lindane)	25	•
76-44-8Heptachlor	25	•
309-00-2Aldrin	25	įυ
1024-57-3Heptachlor epoxide	25	เซ
959-98-8Endosulfan I	25	•
60-57-1Dieldrin	51	įυ
72-55-94,4'-DDE	51.	ប
72-20-8Endrin	51	*
33213-65-9Endosulfan II	51	•
72-54-84,4'-DDD_	51	iυ
1031-07-8Endosulfan sulfate	51	•
50-29-34,4'-DDT	51	•
72-43-5Methoxychlor	250	•
53494-70-5Endrin ketone	51	•
5103-71-9alpha-Chlordane	250	•
5103-74-2gamma-Chlordane	250	ΙŪ
8001-35-2Toxaphene	510	iυ
12674-11-2Aroclor-1016	250	•
11104-28-2Aroclor-1221	250	iυ
11141-16-5Aroclor-1232	250	•
53469-21-9Aroclor-1242	250	•
12672-29-6Aroclor-1248	250	•
11097-69-1Aroclor-1254	510	•
11096-82-5Aroclor-1260	510	•

ab Code: AQUAI	ab Name	::AQUATEC, IN	c.	Contract:89150) 	SSAA-1
Ample wt/vol: 30.1 (g/mL)G	ab Code	: AQUAI	Case No.: 20181	SAS No.:	SDG	No.: 11052
Moisture: not dec. 5 dec. Date Extracted: 02/15/90 Extraction: (SepF/Cont/Sonc)- SONC Date Analyzed: 03/02/90 PC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0 CONCENTRATION UNITS: (ug/L or ug/Kg)Ug/Kg Q 319-84-6alpha-BHC 17/U 319-86-8beta-BHC 17/U 319-86-8delta-BHC 17/U 319-86-8delta-BHC 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2Aldrin 17/U 309-00-2	latrix:	(soil/water)	SOIL	Lab S	ample ID:	110579
Moisture: not dec. 5 dec	ample w	rt/vol:	30.1 (g/mL)G	Lab F	ile ID:	
Extraction: (SepF/Cont/Sonc)- SONC Date Analyzed: 03/02/90 PC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 1.0 CONCENTRATION UNITS: (ug/L or ug/Kg)UG/KG Q	Level:	(low/med)	LOW	Date	Received:	02/15/90
PC Cleanup: (Y/N)Y	Moistu	re: not dec.	5 dec	Date	Extracted	l: 02/22/90
CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 319-84-6beta-BHC	Extracti	lon: (SepF/C	ont/Sonc)- SONC	Date	Analyzed:	03/02/90
CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 319-84-6	PC Clea	nup: (Y/N)	Y pH: 6.7	Dilut	ion Facto	or: 1.0
319-85-7	c	CAS NO.	COMPOUND			
12672-29-6Aroclor-1242	3 3 5 7 3 1 9 7 1 5 5 5 5 1 1	19-85-7 19-86-8 8-89-9 6-44-8 09-00-2 024-57-3 2-55-9 2-20-8 2-20-8 2-54-8 3213-65-9 2-43-5 2-43-5 103-71-9 103-74-2 2674-11-2 1104-28-2 1141-16-5	beta-BHCdelta-BHCgamma-BHC (LinHeptachlorAldrinHeptachlor epoEndosulfan IDieldrin4,4'-DDEEndrinEndosulfan II4,4'-DDDEndosulfan sul4,4'-DDTMethoxychlorEndrin ketonealpha-Chlordangamma-Chlordangamma-ChlordanToxapheneAroclor-1221	fate		17 U 17 U 17 U 17 U 17 U 17 U 17 U 17 U 34 U 34 U 34 U 34 U 34 U 170 U
		3469-21-9 2672-29-6 1097-69-1	Aroclor-1242 Aroclor-1248 Aroclor-1254			170 ע ן

EPA SAMPLE NO.

Lab Name: AQUATEC, INC		Contract:89150	 -	SSAA-	.2
Lab Code: AQUAI C	ase No.: 20181	SAS No.:	SDG N	io.: 1	1052
Matrix: (soil/water)S	OIL	Lab Sa	ample ID:	11058	0
Sample wt/vol:	30.5 (g/mL)G	Lab Fi	ile ID:		
Level: (low/med) L	OW	Date F	Received:	02/1	5/90
<pre>% Moisture: not dec.1</pre>	5 dec	Date F	Extracted:	02/2	2/90
Extraction: (SepF/Co	nt/Sonc) SONC	Date A	Analyzed:	03/0	2/90
GPC Cleanup: (Y/N)Y	pH: 6.1	Diluti	ion Factor	**	1.0
CAS NO.	COMPOUND	CONCENTRATION (ug/L or ug/			Q
319-84-6				19	<u>ש</u>
319-85-7				19	ט j
319-86-8				19	ប j
58-89-9	gamma-BHC (Lind	lane)		19	•
1 200 00 2	Heptachlor			19	•
309-00-2				19	•
1 959-99-9	Heptachlor epox Endosulfan I	k1de		19	•
60-57-1	Dieldrin			19	•
72-55-9	4 4'-DDF			37	•
72-20-8	Endrin			37	•
	Endosulfan II			37 37	•
72-54-8				37	
1031-07-8	Endosulfan sulf	fate		37	
50-29-3	4,4'-DDT			37	•
72-43-5	Methoxychlor_		•	190	•
53494-70-5	Endrin ketone			37	•
5103-71-9	alpha-Chlordane	<u> </u>		190	
5103-74-2	gamma-Chlordane	.		190	
8001-35-2	Toxaphene			370	
12674-11-2	Aroclor-1016			190	ן ט
11104-28-2	Aroclor-1221			190	•
11141-16-5	Aroclor-1232			190	•
53469-21-9	Aroclor-1242	<u>-</u> 1		190	ur i

12672-29-6-----Aroclor-1248

11097-69-1----Aroclor-1254

11096-82-5-----Aroclor-1260

190 U

190 U

370 U

370 U

Lab Name:AQUATEC, INC.	, -	Contract:89150) 	SSAA-3
Lab Code: AQUAI Ca	nse No.: 20181	SAS No.:	SDG	No.: 11052
Matrix: (soil/water)SC	OIL	Lab S	sample ID:	110581
Sample wt/vol:	31.1 (g/mL)G	Lab F	ile ID:	
Level: (low/med) Lo	W	Date	Received:	02/15/90
Moisture: not dec.	dec	Date	Extracted	: 02/22/90
Extraction: (SepF/Cor	nt/Sonc) SONC	Date	Analyzed:	03/02/90
SPC Cleanup: (Y/N)Y	pH: 5.9	Dilut	ion Facto	r: 1.0
CAS NO.	COMPOUND	CONCENTRATI	ON UNITS:	
- CAB NO:	COMPOUND	(ug/L or ug	/Kg)UG/KG 	Q
78-44-8	-beta-BHC -delta-BHC -gamma-BHC (Lind -Heptachlor -Aldrin -Heptachlor epox -Endosulfan I -Dieldrin -4,4'-DDE -Endrin -Endosulfan II -4,4'-DDD -Endosulfan sulf -4,4'-DDT -Methoxychlor -Endrin ketone -alpha-Chlordane -gamma-Chlordane	ate		15 U 15 U 15 U 15 U 15 U 15 U 15 U 15 U 31
12674-11-2 11104-28-2 11141-16-5 53469-21-9 12672-29-6 11097-69-1 11096-82-5	-Aroclor-1016 -Aroclor-1221 -Aroclor-1232 -Aroclor-1242 -Aroclor-1248			310 U 150 U 150 U 150 U 150 U 310 U

EPA SAMPLE NO.

Lab	Name: AQUATEC,	INC.	Contract:89150	SSAA-4
Lab	Code: AQUAI	Case No.: 20181	SAS No.:	SDG No.: 11052

Lab Sample ID: 110582 Matrix: (soil/water)SOIL

Sample wt/vol: 30.1 (g/mL)G Lab File ID:

Level: (low/med) LOW Date Received: 02/15/90

% Moisture: not dec. 7 dec. Date Extracted: 02/22/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/02/90

GPC Cleanup: (Y/N)Y pH: 5.7 Dilution Factor: 1.0

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG 0

| 319-84-6-----alpha-BHC 17 | U 319-85-7----beta-BHC 17 | U 319-86-8-----delta-BHC 17 J U 58-89-9-----gamma-BHC (Lindane) 17 | U | 76-44-8-----Heptachlor 17 | U | 309-00-2----Aldrin 17 | U 1024-57-3-----Heptachlor epoxide 17 | U 959-98-8-----Endosulfan I___ 17 | U 60-57-1-----Dieldrin 34 | U 72-55-9----4,4'-DDE_ 34 | U 72-20-8-----Endrin 34 | U 33213-65-9----Endosulfan II 34 | U 72-54-8-----4,4'-DDD 34 | U 1031-07-8-----Endosulfan sulfate 34 | U 50-29-3-----4,4'-DDT 34 | U 72-43-5-----Methoxychlor 170 | U 53494-70-5----Endrin ketone 34 | U 5103-71-9----alpha-Chlordane 170|U 5103-74-2----gamma-Chlordane 170 U 8001-35-2----Toxaphene 340 | U 12674-11-2----Aroclor-1016 170 U 11104-28-2----Aroclor-1221 170 U 11141-16-5-----Aroclor-1232 170 | U | 53469-21-9----Aroclor-1242 170 U 12672-29-6-----Aroclor-1248 170 U 11097-69-1----Aroclor-1254

11096-82-5----Aroclor-1260

340|U

340 | U

EPA SAMPLE NO.

b Name: AQUATEC, INC. Contra	act:89150 PBLKP1	
b Code: AQUAI Case No.: 20181 SAS N	No.: SDG No.: 1105	2
trix: (soil/water)SOIL	Lab Sample ID: PBLKP1	
mple wt/vol: 30.0 (g/mL)G	Lab File ID:	
vel: (low/med) LOW	Date Received:	
Moisture: not dec dec	Date Extracted: 02/22/9	0
traction: (SepF/Cont/Sonc)- SONC	Date Analyzed: 03/02/9	0
C Cleanup: (Y/N)Y pH:	Dilution Factor: 1	.0
	NCENTRATION UNITS: g/L or ug/Kg)UG/KG Q	
319-84-6alpha-BHC_	16 U	_
319-85-7beta-BHC	i 16 U	1
319-86-8delta-BHC		
58-89-9gamma-BHC (Lindane)	i 16 U	
76-44-8Heptachlor	1 16 U	1
309-00-2Aldrin	16 0	
1024-57-3Heptachlor epoxide	16 U	ľ
959-98-8Endosulfan I	i 16 U	- 1
60-57-1Dieldrin	i 32 U	-
72-55-94,4'-DDE	i 32 U	H
72-20-8Endrin	32 0	
33213-65-9Endosulfan II 72-54-84,4'-DDD	i 32 j U	1
1031-07-8Endosulfan sulfate	32 U	i
50-29-34,4'-DDT	I 32 U	i
72-43-5Methoxychlor_	I 32 U	i
53494-70-5Endrin ketone	160 U	
5103-71-9alpha-Chlordane	32 U	· j
5103-74-2gamma-Chlordane	160 U	i
8001-35-2Toyanhana	160 ju	i
12674-11-2Aroclor-1016	320 U	i
1 11104-28-2Aroclor-1221	160 U	İ
11141-16-5Aroclor-1232	160 U	j
53469-21-9Aroclor-1242	160 U	İ
120/2-29-6Aroclor-1240	160 ju	İ
1109/-69-1Aroclor-1254	160 U	j
11096-82-5Aroclor-1260	320JU	i
,Ardeine	320 U	

EPA SAMPLE NO.

Lab Na	ame: AQUATEC,	INC.		Contract	89150	İ	SSAA	-1MS
Lab Co	ode: AQUAI	Case No.:	20181	SAS No.	<u> </u>	SDG	No.:	11052
Matrix	c: (soil/wate	r)SOIL			Lab Sa	ample ID:	1105	79MS
Sample	wt/vol:	30.2 (g	/mL)G	* ·,	Lab Fi	ile ID:	*****	
Level:	(low/med)	LOW			Date P	Received:	02/	15/90
% Mois	sture: not de	c. 5	dec		Date I	Extracted	l: 02/	22/90
Extrac	ction: (SepF	/Cont/Sonc)	_ sonc		Date A	Analyzed:	03/	02/90
GPC Cl	Leanup: (Y/	N) Y	pH: 6.7		Diluti	ion Facto	r:	3.0
	CAS NO.	COMPOU	ND			ON UNITS: 'Kg)UG/KG		Q
	319-84-6 319-85-7 319-86-8	beta-B delta-	HC BHC				50 50 50	i u i
1	58-89-9 76-44-8 309-00-2	Heptac	hlor	dane)				
ļ	1024-57-3 959-98-8	Heptac Endosu	hlor epo lfan I	xide		· · · · · · · · · · · · · · · · · · ·	50 50	 U
	60-57-1 72-55-9 72-20-8	4,4'-D	DE				100	ii
; 	33213-65-9- 72-54-8	Endosu 4,4'-D	lfan II_ DD				100 100	
<u> </u>	1031-07-8	Endosu	lfan sul DT	fate			100	
.' [72-43-5	Endrin	ketone				500 100	
	5103-71-9 5103-74-2	qamma-	Chlordan	e e	l		500 500	ן ט
} 	8001-35-2 12674-11-2 11104-28-2	Aroclo	r-1016				1000 500	υ
	11141-16-5- 53469-21-9-	Aroclo	r-1232				500 500	U j
	12672-29-6	Aroclo	r-1248				500 500 1000	υj
	_						1.1.71.71.71	4.1 I

11096-82-5----Aroclor-1260

1000 U

1000 | U

SSAA-1MSD

ab Name: AQUATEC, INC. Contract:89150 ab Code: AQUAI Case No.: 20181 SAS No.: ____ SDG No.: 11052 Matrix: (soil/water)SOIL Lab Sample ID: 110579MD ample wt/vol: 30.0 (g/mL)GLab File ID: Level: (low/med) LOW Date Received: 02/15/90 Moisture: not dec. 5 dec. ____ Date Extracted: 02/22/90 Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 03/02/90 PC Cleanup: (Y/N)Y pH: 6.7 Dilution Factor: 3.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg)UG/KG Q 319-84-6----alpha-BHC 51 | U 319-85-7----beta-BHC 51 | U 319-86-8-----delta-BHC 51 | U 58-89-9----gamma-BHC (Lindane)____ 76-44-8-----Heptachlor_ 309-00-2-----Aldrin 1024-57-3-----Heptachlor epoxide___ 51 I U 959-98-8----Endosulfan I 51 | U 60-57-1-----Dieldrin 72-55-9----4,4'-DDE 100 0 72-20-8-----Endrin 33213-65-9----Endosulfan II 100 | U 72-54-8-----4,4'-DDD 100 | U 1031-07-8-----Endosulfan sülfate 100 U 50-29-3-----4,4'-DDT 72-43-5----Methoxychlor 510 U 53494-70-5-----Endrin ketone 100 U 5103-71-9----alpha-Chlordane_ 510 U 5103-74-2----gamma-Chlordane_ 510 U 8001-35-2----Toxaphene 1000 U 12674-11-2----Aroclor-1016 510 JU 11104-28-2----Aroclor-1221 510 U 11141-16-5----Aroclor-1232 53469-21-9----Aroclor-1242 510 | U 510 U 12672-29-6----Aroclor-1248 510 U 11097-69-1----Aroclor-1254 1000 U 11096-82-5----Aroclor-1260

1000 | 0

APPENDIX G GEOTECHNICAL DATA

BUFFALO DRILLING COMPANY



955 NIAGARA STREET BUFFALO, NEW YORK 14213

April 23, 1990

JOB NO: 90-1210B

YEC Incorporated Forest View Professional Building 10 Pinecrest Road Valley Cottage, New York 10989

ATTN: Mr. Mark J. Mecca

RE:

Laboratory Soil Analysis Results

Atlantic Asbestos Site.

Gentlemen:

The enclosed graphs present laboratory soil testing results for a soil sample provided by YEC Incorporated for the above referenced project. The sample was tested in accordance with the following methods.

. ASTM D4318 Liquid limit, plastic limit, and plasticity index of soils.

• ASTM D422 Particle size analysis of soils.

. ASTM D2216 Laboratory determination of water content of soil.

. ASTM D2487 Classification of Soils for Engineering Purposes.

The following list provides numerical results and descriptive terms of the above referenced soil testing efforts:

Moisture content: 23.1%

Atterberg Limits: Liquid Limit - 29%

Plastic Limit - 21% Plastic Index - 8%

Gradation Analysis: Gravel - 7.7%

Sand - 21.2% Silt - 46.9% Clay - 24.2%

Sample Description: Lean clay with sand (CL)

Thank you for the opportunity to assist on this project. Please call if questions should arise.

Very truly yours, BUFFALO DRILLING COMPANY, INC.

David M. Frazier Senior Geologist

Encl.

PRIT	TARY DIVIS			OUP 1BOL	SECONDARY DIVISIONS
	or avels More than	CDAUCIC			Well graded gravels, gravel-sand mistures, little or no fines.
COARSE	HALF OF COARSE FRACTION IS	(LESS THAN, 5% FINES)	GP		Pourly graded gravels or gravel-sand mixtures, little or no fines.
SOILS	Larger Than No. 4 Sieve	GRAVEL	GM		Silty grayels, grayel-sand-silt mixtures, non-plastic fines.
MORE THAN		FINES	GC		Clayey gravels, gravel-sand-clay mixtures, plastic fines.
MATERIAL IS	SANDS MORE THAN	CLEAN SANDS (LESS THAN	SW		Well graded sands, gravelly saids, little or no fines.
LARGER THAN NO. 200	HALF OF COARSE FRACTION IS	5% FINES)	SP		Poorly graded sands or gravelly sands, little or no fines.
SILVE SIZE	SMALLER THAN	Sands Vith Fines	SM		Silty sands, sand-silt mixtures, non-plastic fines.
			SC.		Cleyey sands, sand-clay injectures, plastic fines.
FINE	SILTS AN	D CLAYS	ML		morganic silts, sandy or clayey silts Low to no plasticity.
SOILS	LIQUID L		CL		Inorganic clay, sandy or silly clay. Low to medium plasticity.
MORE THAN		AIT SOM	DL		Organic silt or organic silty clay. Low to medium plasticity.
MATERIAL IS	SILTS AN	D CLAYS	пн		Inorganic silts, diatemaceous or micaceous fine sandy or silty soils.
SMALLER Than No.200	Liquid Limit IS Greater than 50%		СН		Inorganic clays of high plasticity, Fat clays.
SIZE SIEVE			DH		Organic clays of medium to high plasticity, organic silts.
HIGHLY	ORGANIC S	OILS	PT	\$\$. \$\$.	Peat and other highly organic soils.

DEFINITION OF TERMS

101				, -,,,,,				
(Sleve Openings in mm.)	74 .4:	25 2.0	0 4.1	719.0	75.0	300	3.0	
SILT OR CLAY		SAND		GRAVEL		<u> </u>		٦
	FINE .	MEDIUM	COARSE			Cobbles!	BOULDERS	1
 (U.S. Standard Sleve Sizes)	200 94	_		76: 40	7/1			

VeldeLAB DBU21ff				
Sands, gravels and non-plastic sets	BLOWS/FOOT+			
VERY LOOSE	0-4			
LOOSE	4-10			
MEDIUM DENSE	10 - 30			
DENSE	30 - 50			
VERY DENSE	OVER 50			

Consistency

CLAYS AND PLASTIC SILTS	STRENGTH+	BLOYS/FOOT+
VERY SOFT SOFY FIRM STIFF VERY STIFF HARD	0-1/4 1/4-1/2 1/2-1 1-2 2-4 OVER 4	0-2 2-4 4-9 4-16 16-32 OVER 32

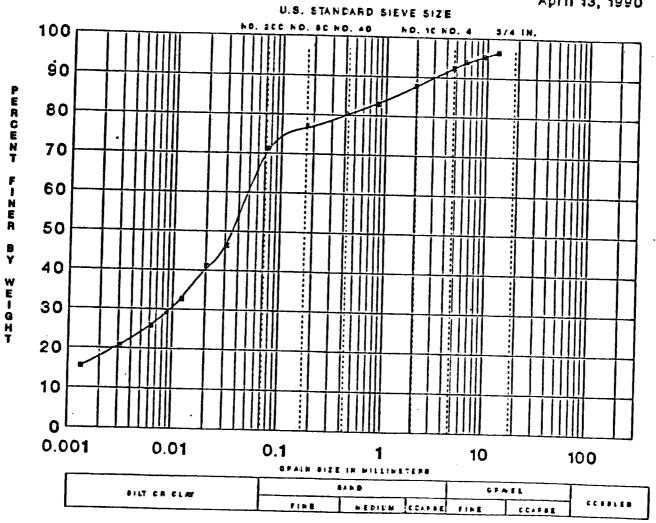
^{*}Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 - 3/8 inch I.D.)

split spoon (ASTM D-1586).

**Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

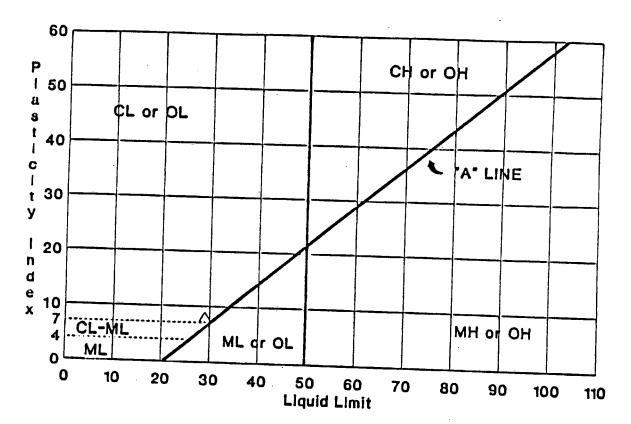
GRAIN SIZE ANALYSIS





BUFFALO DRILLING COMPANY, INC.





SAMPLE NO.	LL (%)	PL (%)	PI
SS#1			(%)
	23	21	8
			ı
	SAMPLE NO.	(%)	(%)

BUFFALO DRILLING COMPANY, INC.

APPENDIX H PHOTODOCUMENTATION



A waste pile south of the mill building near a storage shed.



One of the waste piles adjacent to the lagoons. This material is being incorporated into the soil.



Lagoon at a time when the water was not being pumped out of the mill building. The lighter-colored mass in the lagoon is floating waste paper sludge. It is occasionally dredged from the lagoons and left to dry on the banks.



The mouth of the effluent stream where it empties into the largest pond onsite. The water here has a decidedly gray color, indicative of the large amount of paper waste being discharged into it. A delta of gray waste paper is forming at this location.



WASTE PILE #2, as seen from area of MW-1



WASTE PILE #1, looking uphill from MW-2

APPENDIX I DETAILED METHODS OF ASBESTOS ANALYSIS



P.O. Box 9479, 74 Ethan Allen Dr., S. Burlington, VT 05403 Telephone Number: (802) 658-5798 Telefax Number: (802) 658-6187

March 16, 1990

Aquatec Inc.
Richard Gomez
75 Green Mountain Drive
So. Burlington, VT 05403

RE:Asbestos Analysis by PLM Lab Reference No. 16330 Your P.O. No. 13728

Dear Mr. Gomez:

SL90

Please find enclosed the data sheet for the 9 bulk samples submitted to Shelburne Laboratories on February 23, 1990 (Lab No. SL90-2222-2230).

Analysis was performed by Polarized Light Microscopy (PLM) using dispersion staining and point counting techniques at 100X magnification according to NYSDEC test methods. Samples were dried at 50° C for 16 hours prior to analysis and the results represent percent asbestos after drying. Identification of asbestos by PLM is based on optical crystallographic properties, and gives a qualitative differentiation between asbestos types and other fibrous materials. The results are as follows:

Lab No.	Sample I.D. No./Description	Results	% Solids
2222	110525 ETR No. 20181	No Asbestos Detected	24%
2223	110526 ETR No. 20181	Positive for Asbestos 67% Chrysotile	48%
2224	110527 ETR No. 20181	No Asbestos Detected	30%
2225	110528 ETR No. 20181	No Asbestos Detected	62%
2226	110529 ETR No. 20181	Positive for Asbestos 31% Chrysotile <1% Amosite <1% Crocidolite	50%
2227	110530 ETR No. 20181	Positive for Asbestos 22% Chrysonle	33%
228	110531 ETR No. 20181	Positive for Asbestos 44% Chrysotile 3% Amosite	49%
229	110577 ETR No. 20181	No Asbestos Detected	75%
230	110578 ETR No. 20181	No Asbestos Detected	80%

001153

SPECIALISTS IN MATERIAL ANALYSIS



P.O. Box 9479, 74 Ethan Allen Dr., S. Burlington, VT 05403 Telephone Number: (802) 658-5798 Telefax Number: (802) 658-6187 March 23, 1990

Terry Schneider, Staff Geologist YEC, Inc. 10 Pinecrest Road Valley Cottage, NY 10989

Dear Ms Schneider,

At your request, I am sending you a description of the analysis technique used for the analysis of nine bulk/sludge samples—submitted to Shelburne Laboratories on February 23, 1990 by Richard Gomez of Aquatec, Inc.

Rather than rewrite the method for you, I have enclosed a copy of the Stratified Point-Counting Technique for Identifying and Quantifying Asbestos in Bulk Samples. Section 4 describes the sample preparation, and sections 5.2.2 thru 5.3 explain the point-counting calculations. In addition to this methodology, portions of the homogenized samples were dried in a drying oven at 50° C for 16 hours before preparation.

As Aquatec requested, additional alloquots were weighed before and after drying under the same conditions to determine the percent solids. Listed below are the pre and post weights:

SL90-	Pre-Weight	Post-Weight	
<u>Lab No.</u> 2222	milligrams	<u>milligrams</u>	% Solids
•	792.86	192.16	24
2223	804.85	385.20	48
2224	760.20	231.57	30
2225	441.71	273.46	62
2226	825.73	412.92	50
2227	687.21	229.94	33
2228	605.20	297.95	49
2229	894.35	667.01	75
2230	818.02	652.26	80

Should you have any questions, please do not hesitate to contact me.

Sincerely,

Bryin Schultz

Bryan-Schu

Laboratory Manager

Enclosure

Shelburne Laboratories has been and is currently accredited under Section 206 (d) of Title II of the USC Chapter 15, TSCA as stated in 40 CFR 763, April 30, 1987 and accredited in the NBS NVLAP (Lab. No. 1025) and NIOSH PAT Program.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

Bryan Schultz

Laboratory Manager

BS/IIn

Enclosure



P.O. Box 9479, 74 Ethan Allen Drive South Burlington, VT 05407 (802) 658-5798 Fax: (802) 658-6187

PLM Data Sheet Method: EPA-600/M4-82-020 December 1982

Client Name: Aquatec, Inc.

Client Project Identification: 89150

Lab Reference:

160330

Project Location:

Page 1 of

7		Mor	Morphology		% Asbestos Results			Page 1 of 1 % Non-Asbestos Results					
Lab# SL90	Sample ID	Color	Fri	Non Fri	Pos/		1	Other	Fib.	Call	-Asbesto Synth	Other	Non
2222	110525 ETR No. 20181	grey	_	rn	Neg				Glass	89	- J		Fib.
. 2223	110526 ETR No. 20181	grey	-		+	67				22			isel
2224	110527 ETR No. 20181	grey	V		_				,	93		···	bul
2225	110528 ETR No. 20181	gray	-		-					95			bal
2226	110529 ETR No. 20181	gray	v		+	31	<1	*</td <td></td> <td>41</td> <td></td> <td></td> <td>bal</td>		41			bal
2227	110530 ETR No. 20181	gray	~		+	22				48			bal
2228	110531 ETR No. 20181	9004	-		+	44	3			32			bal
2229	110577 ETR No. 20185	ten	-		_					<			bel
2230	110578 ETR No. 20185	tan	-		-					3		·	bel

Comments: +5190-2226	< 1% crocidalit	k
Olym	pus BUZ	e prior to analysis.
Received By:		Date: 62-23-90
Prepped By: Analyzed By: Sugar	Q.	Date: <u>03-05-98</u> Date: <u>03-05-98</u>
Report By: Sym S.	h-	Date: 03-05-90

This report applies to the samples tested, and are not necessarily indicative of the qualities of apparently identical or similar materials. Shelburne Laboratories assumes no responsibility or liability for the manner in which these results are used or interpreted. This report is for the exclusive use of the client to whom it is addressed.

STRATIFIED POINT-COUNT TECHNIQUE FOR IDENTIFYING AND QUANTITATING ASBESTOS IN BULK SAMPLES

Environmental Laboratory Approval Program

Wadsworth Center for Laboratories and Research

New York State Department of Health

June 1989

7. Precision and Accuracy.

7.1. Precision. Theoretically, the point-count method (when performed with 400 points) should yield a relative standard deviation no better than 50% at a composition of 1% asbestos. However, depending on matrices within a bulk sample, the point-count method (when performed with 300 or more points) has yielded relative standard deviations of 25% or less at compositions between 1 and 3 percent asbestos (Perkins 1989). Similar results were derived from synthetic bulk samples with formulated weight compositions; relative standard deviations ranged from 24 to 45% for replicate samples containing 5 to 7% chrysotile and amosite (Webber et al. 1989). Certain matrices (e.g., chrysotile in vermiculite or cellulose) tend to increase analytical variability.

Although intralaboratory precision with the 400-point method improves with

increasing asbestos concentrations, precision in a stratified scheme will be reduced as the number of points counted are reduced. This reduction in precision is not critical, however, since only samples with high asbestos concentrations will have substantially decreased numbers of points counted. These samples have asbestos concentrations well in excess of 1% and thus are categorically ACH.

7.2. Accuracy. The point-count method is usually more accurate than the visual estimation method at quantitating asbestos concentrations in bulk samples, especially at low concentrations (Perkins 1989, Webber et al. 1989).

Nonetheless, there are material combinations which seem to cause biases, e.g., the presence of cellulose causes underestimation of chrysotile while amosite in plaster is usually overestimated. In even these instances, however, point-count results are usually closer to actual weight percents than visual-estimation results. For such problematic matrices, laboratories could formulate low-level asbestos bulk samples (Webber et al. 1982) and determine their biases and compensate for these in calculating their results.



P.O. Box 9479, 74 Ethan Allen Dr., S. Burlington, VT 05403 Telephone Number: (802) 658-5798 Telefax Number: (802) 658-6187

March 5, 1990

Aquatec, Inc.
John Hulbert
25 Green Mountain Drive
So. Burlington, VT 05403

RE: Total Fiber Count by PCM (NIOSH 7400)

Lab Reference No. 16331 Your P.O. No. 13744

Dear Mr. Hulbert:

Please find enclosed the data sheets for the 4 air monitoring samples submitted to Shelburne Laboratories on February 23, 1990 (Our Lab No. SL90-2231-2234). Analysis was performed by Phase Contrast Microscopy (PCM) using an Olympus CH-2 microscope (serial # 700323) at 400X magnification according to NIOSH Method 7400. This method is an approved procedure for the NIOSH Proficiency Analytical Testing (PAT) asbestos fiber counting program. Fiber counting performed by PCM is based on particulate size and shape, and is not intended as a means of identification. All fibers having a length to width ratio of 3:1 and a length of five microns or greater are counted. The results are as follows:

SL90 Lab No.	Sample I.D. No.	Air Volume (Liters)	Results
2231	#1	1440	No Fibers Detected
2232	#2	1434	BDL* (.001 f/cc)
2233	#3	1425	BDL* (.001 1/cc)
2234	#4 (Blank)	****	No Fibers Detected

^{*}Below Detectable Limit (Less Than 5.5 Fibers Per 100 Fields)

Shelburne Laboratories has been and is currently accredited under Section 206 (d) of Title II of the USC Chapter 15, TSCA as stated in 40 CFR 763, April 30, 1987 and Proficient in the NBS NVLAP and NIOSH PAT Program.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

Bryan Schultz

Laboratory Manager

ma heli

BS/IIn

Enclosure



P.O. Box 9479, 74 Ethan Allen Drive South Burlington, VT 05407 (802) 658-5798 Fax: (802) 658-6187

Client Name: Aquatec, Inc Client Project Identification Project Location:		·			Lab Reference:	160331
Lab Number: SL90- 2231 Sample Description: BQL BDL	Sample I	dentification: #1 QC	PR.∕	A Checked: _	R	
			- 385mm^2 855mm^2		Calculations	
		100 (To	etal Fibers) etal Fields)	0	Average Fibers/Fields	
		0.0075mm^2 Fibers/Cubic	-	=_0	£/mm^2	
				(Effective x -	$\frac{1}{1440 \text{ L}} \times \frac{1}{1000cc} = -$	<u>O</u> (/cc
BQL (Below Quantifiable L The above calculations are baserrors which might occur due the client on his/her cassettes	sed on the air vol	umes supplied to us	with your sar	nple(s). Shelbu	Detectable Limit): < 5.5 fiber	
the client on his/her cassettes Microscope: Olympus Cl	•	heets. AIHA Accr	editation No. 3	procedures of t	vie recording of incorrect air vo	lumes by
Received By: 5A Prepped By:		•		— Dai	e: 3-2-90	
Analyzed By: Report By:	JEMUM	"4/		— Dat	3-5-40 3-5-50	



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Client Name: Aquatec, Inc.	
Client Project Identification: 89150	Lab Reference: 16033
Project Location:	
Lab Number: SL90- 2232 Sample Identification: #2	
Sample Description:	1
BQL PRA Checked:	<u>H</u>
Effective Area 25mm = 385mm^2 37mm = 855mm^2 Fiber Density	Calculations
	Average Fibers/Fields
$\frac{.03 \text{ (Fibers/Fields)}}{0.0075 \text{mm}^2 \text{ (Field Area)}} = \frac{4}{100000000000000000000000000000000000$	/mm^2
Fibers/Cubic Centimeter 1/2 4/2 (/mm^2 x 385 (Effective x Area)	$\frac{1}{1434} \text{ L} \times \frac{1}{1000cc} = \frac{-00/}{100} \text{ f/c}$
	tectable Limit): < 5.5 fibers/100 field e Laboratories is not responsible for recording of incorrect air volumes by
Microscope: Olympus CH-2	
Received By: GA Date:	3-v-90
Prepped By: Date:	3- (- 6)
Analyzed By: Date: Report By: Date:	3-5-90



Client Name: Aquatec, Inc.

Shelburne Laboratories

P.O. Box 9479, 74 Ethan Allen Drive South Burlington, VT 05407 (802) 658-5798 Fax: (802) 658-6187

Client Project Project Loca	ct Identification:	89150		Lab Reference: 160331
Lab Number	r. SL90- 2233	Sample Id	dentification: #3	
BQL	EDY	ND	QC PRA C	hecked:
			Effective Area 25mm = 385mm^2 37mm = 855mm^2 Fiber Density	Calculations
			/ (Total Fibers) / (Total Fields) = -	-0 / Average Fibers/Fields
			$\frac{O / (Fibers/Fields)}{0.0075mm^2 (Field Area)} = -$	1,33 t/mm^2
			Fibers/Cubic Centimeter 1.33 f/mm^2 x 385 (Eff Are	fective x $\frac{1}{1425 \text{ L}} \times \frac{1}{1000cc} = \frac{200}{1000cc}$ f/cc
The above cal	Olympus CH-	d on the air volt improper sample d sample data s	ers/100 BD	L (Below Detectable Limit): < 5.5 fibers/100 fields etc.). Shelburne Laboratories is not responsible for cedures or the recording of incorrect air volumes by
Prepped By: Analyzed By: Report By:	DEC	EMU		Date: 3-5-90



P.O. Box 9479, 74 Ethan Allen Drive South Burlington, VT 05407 (802) 658-5798 Fax: (802) 658-6187

Client Name:	Aquatec, Inc.			
Client Project	Identification:	89150		Lab Reference: 16033
Project Locati	on:			10033
Lab Number:	SL90- 2234	Sample Ide	entification: #4	
Sample Descr	iption: (Blank)			
BQL	BDL		QC PRA C	Checked:
			Effective Area 25mm = 385mm^2 37mm = 855mm^2 Fiber Density	Calculations
			O (Total Fibers) 100 (Total Fields)	O Average Fibers/Fields
			(Fibers/Fields) 0.0075mm^2 (Field Area)	
			Fibers/Cubic Centimeter	
		,		ea) $x = \frac{1}{0} x \frac{1}{1000cc} = \frac{0}{1000cc}$
		nit): < 10.0 fibe		OL (Below Detectable Limit): < 5.5 fibers/100 field
CLIOIS MITTELL IIII	Run occur ane to	nutroper sampli	mes supplied to us with your sampling procedures, pump calibration proceds. AIHA Accreditation No. 361	e(s). Shelburne Laboratories is not responsible for occdures or the recording of incorrect air volumes by
Microscope:	Olympus CH-	-2		
Received By:	SA			Date: <u>3-2-90</u>
Prepped By:	RE			Date: 3-5-90
Analyzed By:	47	-//		Date: 3-5-90
Report By:	1 Ollu	If Y MIL	u	Date: 3-5-90
		/		



75 Green Mountain Drive, So. Burlington, VT 05403 TEL. 802/658-1074

ANALYTICAL REPORT

YEC, Inc. 10 Pine Crest Road

Valley Cottage, NY 10989

Date

: 03/16/90

ETR Number: 20185

Project No.: 89150

No. Samples: Arrived

: 02/15/90

Attention : Dr. Y.S. Ed Chen

Page

SDG:110525 Atlantic Asbestos Site

 Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020,
 Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/l unless otherwise noted.

Method No.

Parameter

SUBCON

Asbestos by PLM

Lab No. Sample Description 110577 SDAA-3:02/14/90 @1300 SDAA-4:02/14/90 @1325 110578

Result

<1

<1

Comments/Notes

Note Asbestos results are reported as percent.

000004

< Last Page >

Submitted By :

Aquatec Inc.

Y.S. Edward Chen, Ph.D., P.E. March 29, 1990
Page 2

An asbestos determination was performed on samples SWAA-1 and SWAA-2 using a modified Total Suspended Solids procedure previously approved by YEC, Inc. The gravimetric test performed measured both asbestos and non-asbestos residue retained on a 0.45 micron filter. The reporting limit for this test is 100 mg/l (<0.01%).

Sincerely,

Joseph K. Comeau, Ph.D.

Vice President

Chemistry Division

JKC/lam

Enclosure

89150B29MAR90

